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THE TRAGEDY OF WASTE

BY

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Political economy and social economy are amusing intellectual games; but vital economy is the philosopher's stone.

George Bernard Shaw.

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THE TRAGEDY OF WASTE

CHAPTER I

THE CONTROL OF INDUSTRY

You and three others are approaching a spruce-clad island on a lake in the virgin wilderness of northern Ontario. You have two canoes and between their thwarts lie your food, your tent, your axes. The nearest Hudson Bay Post is 100 miles to the south. You are on your own. Completely. It is after six in the evening and storm clouds are banking in the east. It promises a wet night in camp.

What precisely is your procedure as the canoes ground on the beach? With small variations depending upon the expertness of your technique, your procedure is this. The tent is slung and ditched on a high level spot. If time allows, bedding is cut. Blankets and spare clothing are safely stowed inside. The canoes are turned over and supplies stored beneath them. A small cooking fire is lighted between two upright stones and supper started. To be fed after a twenty-mile paddle, to keep warm and dry against the storm—every motion is conserved to that end. To defy it may turn a summer holiday into a tragedy.

But suppose one of you had roamed the woods and brought back poisonous toadstools for a mushroom soup; one had lain down on the beach and gone to sleep; one had cut down tall trees for tent-poles when all that was demanded was a rope slung between two standing trees; and

one had built a fire fit for the roasting of an ox, which presently began to eat its way into the forest.

Even those who picnic in Fords would quail before such a mad performance. But for 100,000,000 of us living under the blessings of *laissez faire* in America, its industrial counterpart is known and practiced as business-as-usual. For in this mad camping party we have illustrated the four great channels of waste which normally obtain in the going structure of industry.

1. The toadstool broth represents the man-power which flows into the furnishing of vicious or useless goods and services—patent medicines, opium, super-luxuries, the bulk of advertising, war.
2. The sleeper on the beach represents the man-power which on any given working day is doing nothing—by virtue of unemployment, strikes and lockouts, preventable accidents and diseases, the idle rich and the wandering hobo.
3. The hewer of tent poles represents the excess man-power required to produce and distribute necessities and comforts because the technical arts—the best way of doing the job—are not made use of. Failure to use scientific management, standardization failures, excess plant capacity, restriction of output, lack of cost control, cross hauling, failure to utilize by-products, excessive distribution costs, and above all the failure to co-ordinate national production to national requirements—demonstrated as not beyond the range of human administrative capacity, by the war—all combine to force the taking of two steps where one would suffice.
4. The fire builder represents the waste of natural resources. In lumber, in coal, natural gas, oil, minerals, soils, fisheries, a continent has been gutted, and for every ton reclaimed a ton and more has been needlessly and irretrievably lost.

No analogies are ever exacted, but I believe that this is a fair analogy. As one goes deeper and deeper into the

statistical studies, the government reports, the findings of specific surveys, the great mass of quantitative data already available covering these four main channels of waste, it becomes increasingly evident—with an evidence which stuns—that what is madness and folly in a camping party is normal and unchallenged in a great industrial society considered as a whole.

It is the purpose of this book to set forth in some detail the quantitative evidence, grouped into the four main channels, and finally to come to some rough conclusions as to the total man-power lost in the first three, and the loss and leakage of natural resources in the fourth. Any exact computation is manifestly absurd, but perhaps it will be possible to show at least a minimum margin of waste. And we can promise that this minimum is still immense—enough, if it could be taken up, utterly to abolish poverty, enough to bring the good life within the reach of the last family in America!

Not four of us, but 100,000,000 are beaching our canoes under a rising storm from the east. Can the millions ever bring themselves to act with the purpose and the sanity of the normal four? That is the challenge of waste.

War control

Perhaps the most realistic introduction to our subject lies in an analysis of the war control of industry. Thus we start not with theory but with tangible performance. So far-reaching, so unprecedented—and so little realized in the public mind—were the effects of this control, and the savings in human energy resulting therefrom, that we cannot do better than to sketch its outline. The world war was perhaps the greatest single tragedy which ever overwhelmed the human race—a biological species already

sufficiently inured to tragedy. But the war had its by-products of technical achievement as well as its main product of destruction and despair. The chief by-product was the elimination of industrial waste made possible through the co-ordinated control of the economic structure.

At the beginning of 1917 there were some 40,000,000 able-bodied workers in the United States. There were another 20,000,000 able-bodied housewives, leaving perhaps 45,000,000 dependents—children, old people, sick people. Under the economic system prevailing at the time, the 40,000,000, working in fields, factories, stores, offices, provided an amount of goods and services, which, while enormous in the aggregate, was still insufficient to procure for the majority of the population what the United States Department of Labor terms a "minimum budget of health and decency." This budget called for food, shelter and clothing plus a few modest comforts, and, for a family of a father, mother and three children, ran in the neighborhood of $1,700 a year. Less than a third of the families in America were receiving as much as this, and accordingly modern industrialism, whatever else its virtues, did not provide enough to go round in terms of houses, shoes, overcoats, bread, milk, schooling and health protection. The slums of the great cities, the condition of the tenant farmer, the plight of the small storekeeper and often the small professional man, confirmed this evidence. Of the reasonable comforts there was a great shortage; of the prime necessities—particularly housing—there was shortage enough.

In April of 1917 we entered the world war. We entered it with 40,000,000 workers who, between them, had been unable hitherto to provide themselves with the necessities and comforts of life. Within a few months, millions of the strongest and healthiest of them went into the army, into the navy, or into the manufacture of powder, battleships,

submarines, poison gasses, bayonets, rifles, bombs, gun carriages, aeroplanes. The Secretary of War in his annual report for the year 1918 gives us the diversion of man-power as follows:

	Number	*Per Cent*
Men in France fighting	1,400,000	4.7
Men in France behind lines	600,000	2.0
Men in army, United States	1,700,000	5.7
Men in navy	550,000	1.8
Total army and navy	4,250,000	14.2
Men in war work	7,150,000	23.8
Total unproductive	11,400,000	38.0
Men in non-war work	18,600,000	62.0
Total men of producing age	30,000,000	100.0
Old men and boys	24,000,000	
Total males	54,000,000	
Women in war work	2,250,000	
Total women gainfully employed	9,000,000	(estimated)

Thus of 30,000,000 men of producing age, over 4,000,000 went into the army and navy, and 7,000,000 into munitions and war work, a total of over 11,000,000, or 38 per cent of the available man-power. Meanwhile 2,000,000 women out of a total of perhaps 9,000,000 gainfully employed, entered war work. Some of these women came into industry for the first time, some simply transferred from textiles to gun cotton. Out of the grand total of some 40,000,000 gainfully employed no less than 13,500,000 turned warriors, or to the manufacture of equipment for warriors. We cannot, however, consider this total as entirely nonproductive, for a certain fraction of the war workers were engaged in making uniforms and boots and other prime necessities which the men in the army needed, war or no

war. A conservative estimate would seem to indicate at least ten millions of true nonproducers, or one-quarter of the total labor power.

If four of us are building a house, and one goes home with a smashed finger, the house is going to rise more slowly. If forty millions of us are making food, shelter, clothing and comforts with a net shortage from the health and decency budget standpoint, and ten millions of us quit to go off to the wars, the budget of health and decency must show an even greater shortage. Did it? It did not. It more than held its own.

The index number of the physical production of commodities by weight (not money) increased from 112 (1911-1913 taken as 100) in 1915, to 124 in 1917, to 125 in 1918.[1] The United States Council of National Defense after an exhaustive study of the situation declared: "America's industrial and economic achievements during the war, notwithstanding depleted man-power and diversion of productive effort to war purposes, demonstrate the ample ability of the nation to sustain its population according to a standard of living equal to or above standards which obtained previous to the war."[2]

According to the figures of the National Bureau of Economic Research, the workers increased their relative share of the national income in 1918 as against property owners, the total rising from 68.9 per cent in 1917 to 77.3 per cent in 1918.[3] The curtailing of nonessential industries and luxury production during the war, probably operated to divert more of the essentials and comforts to the working man than, on the average, he had ever before enjoyed. He tended to take a greater relative share of the increased physical production. We know beyond peradventure that the production of food accelerated during the war, and food is the main item on the worker's budget. The housing short-

age was not materially abated, but increases in food, clothing and comforts made up for it. Mr. David Friday maintains that production increased sharply by weight during the war, that the standard of living rose, and that workers' savings accumulated as never before. While it is not proved that real wages—as contrasted with money wages, rose, the fact that more members of the family tended to be at work and more *steadily* at work, operated to give the family a greater net purchasing power in terms of actual goods. On the whole the evidence seems to warrant the conclusion that, despite the crudities and blunders of certain aspects of the new technique, with one-quarter the man-power gone, the standard of living held its own and probably increased somewhat. The house went up faster with three men than it did with four. The 30,000,000 turned out as much if not more by way of food, shelter, clothing and comforts than the 40,000,000 had ever done.

War itself, as we shall see, is the quintessence of waste, and the increased standard of living which it brought about indirectly for the home population was sorry recompense for the direct loss suffered through death, wounds, mutilation, shell shock, hate, bitterness and the relentless monotony of the trenches. What we seek to demonstrate has nothing to do with war as war. The ten millions in America might all have left to dig a canal across the Andes. What we ask consideration for is the astonishing phenomenon of the less workers the more production per capita of the necessities of life. How did it happen? What new forces entered the industrial field? What miracle occurred?

No miracle. Only common sense. Faced with grave national danger, and acting under the psychological unity which common danger imparts to a group, the warring nations reorganized their industrial systems on the principle

that a straight line is the shortest distance between two points. This principle tends to become mislaid in times of peace. It is not operating now in 1925 for instance. While there may be today great efficiency in any individual concern, it is an efficiency devoted almost exclusively to the maximum number of dollars to be made. In normal times, modern civilization pays little heed to finding out the requirements in food, shelter and clothing of its populations, and to the directing of its man-power, its natural resources, and its plant and equipment to meet these requirements. Wesley C. Mitchell puts it thus:

"In detail, economic activity is planned and directed with skill; but in the large there is neither general plan nor developed direction. Civilized nations have not yet developed sufficient intelligence to make systematic plans for the sustenance of their populations; they continue to rely upon the badly co-ordinated efforts of private initiative." [4]

He wrote this in 1913, before the war. He was to see, within a few years, that civilized nations could, under great emergency, develop sufficient intelligence to make systematic plans for the sustenance of their populations. And he was to see, with the end of the emergency, conditions revert to his original description. During the war, the sense of crisis created the unity necessary for control.

In the United States, the Railroad Administration took over the railroads, eliminated a vast amount of cross hauling and parallel traffic; found out what goods were to be moved and where, and proceeded to move them according to pre-arranged schedule. It consolidated terminals, loaded trains full of freight, instead of the more usual part loading, and eliminated 57,000,000 passenger train miles, while carrying more passengers. The Food Administration budgeted requirements and took charge of the production and distribution of foodstuffs. The War Industries Board.

by means of its system of priorities, worked out a program for the operation of industrial plants on the balanced load basis. It controlled the awarding of contracts, the fixing of prices, the allotments of raw materials, power and labor. Nonessential industries, such as super luxuries, were discouraged, essential industries were encouraged. Its economies through standardization and simplification of industrial products were very great. It saved 50,000,000 yards of wool, 260,000 tons of tinplate; cut the styles of stoves and heaters 75 per cent, eliminated 5,500 styles in rubber footwear, cut tire varieties from 287 to 32, cut shoe colors from 81 to 6, cut trunks to 6 sizes, reduced washing machine styles from 446 to 18, and eliminated 90 per cent of household wringer styles, cut pocket knives from 300 styles to 45, plows from 312 to 76, harrows from 589 to 38, and saved 600,000 barrels of flour by improved bread marketing methods.[5] When the armistice was signed in 1918, the Conservation Division of the War Industries Board had prepared conservation programs for 269 industries. It was estimated that these programs would yield an annual saving of 15 per cent in the quantity of materials used in the United States.

The Fuel Administration determined coal requirements for every industry and every community in the country, and proceeded to route coal on a straight line basis in accordance therewith. It raised coal production from 590,000,000 tons in 1916 to 680,000,000 tons in 1918—an unprecedented total. The Capital Issues Committee controlled the financing of new companies in the public interest. No credits were allowed to nonessential industries. The Sugar Equalization Board took charge of the nation's sugar supply. It held the price to 8 cents for two years. On its dissolution, sugar went to 24 cents. The United States Grain Corporation eliminated speculation in cereals, and

controlled the production of flour. The United States Housing Corporation built houses where they were needed for war workers. The War Labor Board co-ordinated employment and supervised working conditions.

Particularly important was the system of priorities. As Alvin Johnson points out: "The application of the priority principle to transportation and production is quite in accord with plain common sense. It is none the less revolutionary in its social economic implications. What it means is that necessities have the right of way. If we have excess productive capacity, the unessentials and luxuries may be provided, but not otherwise. And necessities are definable in terms that take account only of physical requirements. There is no room in the definition for class distinction. A new country house may seem a matter of necessity for the man of fortune, but he will persuade no priority board to permit shipments of building material while cars are needed for coal and wheat." [6]

War control lifted the economic system of the country, stupefied by decades of profit seeking, and hammered it and pounded it into an intelligent mechanism for delivering goods and services according to the needs of the army and of the working population. Money tended to fall out of the picture. The war boards thought summarily in terms of tons of steel, bushels of wheat, and board feet of lumber. This extraordinary unity, this extraordinary common sense—despite many initial blunders—succeeded in withdrawing a quarter of the working force, and yet raised the standard of living for the underlying population.

Thus we are given a concrete and a realistic illustration of the potential waste in economic effort which takes place during normal times. The now forgotten cry of "reconstruction," was an attempt on the part of those who glimpsed this contrast to continue the war control of economic activ-

ity as a mighty mechanism to abolish waste, and with it poverty. David Friday voiced this hope in 1919:

"The most important and difficult task just ahead is to maintain the productive level of which we found ourselves capable during the war. We have increased our output of products 25 to 30 per cent over the pre-war period through the complete utilization of our national resources, our plant and machinery, and our labor. If production is allowed to return to the pre-war level, output will slump off by 20 per cent. This would mean a corresponding waste of productive resources and a decrease of $14,000,000,000 per annum in our national income as measured by the present price level. In view of the magnitude of this waste, the government can well afford to spend several billions per annum if need be to maintain the level of productive output."[7]

Sir Leo Chiozza Money showed that England after the Armistice was organized for maximum output; that it was easier to build a small, well-equipped dwelling house, than it was a tank; easier to make a good cooking appliance than a field gun; easier to make a chair than an aeroplane propeller—in short that peace-time production was a simpler problem than war production. With the war control functioning exclusively on food, shelter, clothing and comforts, there was, he maintained, literally no end to the possibility of raising the standard of living.[8]

But reconstruction collapsed, normalcy returned, output slumped drastically, unemployment raised its ugly head, 1921 registered a terrible business depression, and in America, with the four men back on the job, the house went up more slowly than it had done with three. An economic system which can, by taking thought, make three men do the work of four, merits perhaps a rather careful examination into the sources and extent of economic waste. Mr. Herbert Hoover writing in February, 1921, summarized

the case: "Certain proof of our deficient normal production is shown when, with 20 per cent of man-power withdrawn into the army, we yet produced 20 per cent more commodities than we are doing today." [9]

Three billion slaves

We have spoken of the failure of the 40,000,000 workers to provide themselves adequately with the necessities and comforts of life in normal times. In Chapter XIII the specific figures are presented to support this view. Whether the standard of living of the average working class family has materially bettered as against 30 years ago, is still a matter of debate among economists. There is undoubtedly a greater volume of production per capita, and a far greater variety of goods to choose from, but the quality of modern goods is a more dubious matter. Granting, however, a higher standard of living today, it cannot be claimed that that standard has yet raised the majority of the population above the line of the minimum budget of health and decency, or that the net increase has been more than very moderate. The average income for two-thirds of the families of the country today will not exceed $1,500 —a total which does not permit much by way of the good life.[10]

Meanwhile the last 30 years have witnessed a phenomenal increase in the technical arts of production. Messrs. Gilbert and Pogue have estimated that "it would require the labor of 3,000,000,000 hard-working slaves to accomplish the work done annually in the United States by our energy resources" . . . basing their calculation on the 150,000,000 horsepower now secured from our boilers and turbines, multiplied by 20 man-power for every horse-power. "The use of energy materials gives to each man, woman and

child in this country the equivalent of 30 servants."[11] Roger W. Babson recently prepared a table showing the increases in machine efficiency over hand efficiency in various industrial processes. The figures cover ratios not hours.[12]

	Machine Time	*Hand Time*
Men's boots	1	9
Cotton sheeting	1	106
Woolen skirts	1	76
Brussels carpets	1	8
Butcher knives	1	29
Pine boards	1	58
Marble slabs	1	539
Iron pipe	1	18
Nails	1	129
Lead paint	1	17
Hemp twine	1	119
Plows	1	32
Pitchforks	1	15

Even after making due allowance for the man-power necessary to construct and maintain the power plant, machines and equipment—which must always be reckoned as an offset against such figures as those of Mr. Babson—it is evident that we have available today a possibility of production far in excess of the capacity of any previous civilization. Greece at the summit of her glory, averaged only five helots to the family, or about one slave per capita, as against our thirty mechanical ones. How far does the standard of living of the average American family exceed that of Greece, 2,500 years ago? Our quantity may be greater, but our quality, particularly in the arts, is not to be compared. What return in terms of livelihood, comfort, leisure and beauty do we get from the labor of 3,000,000,000 mechanical slaves? Among other things we get Pittsburgh,

New York's East Side, back of the Yards in Chicago, the tenant farmer, and cemetery sculpture. Where has this mechanical man power gone, that relatively so little good comes from it? Its dissipation provides another reason for a rather specific inquiry into the sources and extent of economic waste.

CHAPTER II

THE AEROPLANE VIEW

The study of loss and leakage in industry may start from the bottom up, or from the top down. The nation-wide figures already examined in connection with war control, incline us to the latter approach. Taking the United States as an industrial whole—though recognizing the many contacts with world economy—we shall first try to secure a bird's-eye view of our own country, and so work down to the individual industry, and sometimes to the individual plant. This taxes the imagination, but saves the confusion of beginning in an intermediate zone unrelated to any broad framework in which the whole problem may be set. Too many studies of waste have begun and ended in the middle. This chapter is an attempt to carry into peace-times, the national viewpoint which the several boards, commissions and administrations were constrained to take during the war.

Up to comparatively recently, economic waste meant chiefly the garbage pail—the salvaging of products normally thrown away. The housewife has known it as the enemy of thrift—the "preserving" of the surplus fruit crop, the "making over" of clothes, the wiping of muddy feet on the scraper outside the front door. The business man is beginning to think of it as any controllable element which tends to depress profits—sometimes high operating expense, sometimes insufficient selling expense to get the

desired volume of sales. The engineer knows it as any bar to maximum output with minimum energy, even if it means, as in the case of Frederick W. Taylor's high speed steel work, the attainment of maximum efficiency by wearing out a cutting tool in a few minutes' time. The good Republican knows it as any increase in government expenditures. The conservationist knows it as any irreparable destruction of natural resources.

From these definitions one must pick and choose. Waste will always be more or less of a relative term meaning different things to different people. An exact and universal definition is out of the question. On the whole we incline, for the purposes of this book, to the engineer's definition—namely, any bar to maximum use value of output at minimum real cost in energy and materials. Perhaps our position can best be outlined by what may be called an aeroplane view of America.

Suppose that Mr. David Friday and Sir Leo Chiozza Money had had their way—that "reconstruction" had actually taken form in tangible accomplishment instead of being only a bright promise which flickered for a moment and then went out under the cold douche of normalcy. Suppose that the war control of industry had been maintained to direct a war against poverty and low living standards. Suppose that instead of killing Germans, the organization had been directed to the killing of malnutrition, slum dwelling, shoddy clothing, infant mortality, occupational diseases, starved opportunity, illiteracy and ignorance. What would have been the job of the Industrial General Staff in its Washington headquarters; what steps would it be forced to take to appraise the situation and win such a war? If we can outline, however barely, its initial survey, we can perhaps get a picture of an economic

society where waste is at a minimum, that will serve as a bench mark, against which the actual performance of the work-a-day world may be measured. This plunges us into a field of manifold uncertainties, and of occasional absurdities, but if the analysis of waste is to be regarded as a community synthesis rather than as a picking over of refuse heaps, or as a device to increase profits under the price system, it is a field which must be entered.

As in the war with Germany, the General Staff would be forced to regard the industrial process in terms of man-power, natural resources, physical plant, stocks of goods, transportation load, and consumptive requirements, rather than in terms of money. Money after all is not very digestible. It has its uses and it has its abuses, but green-backs under a boiler never raised a pound of steam.

What are the relevant physical facts? They are essentially those which an aeroplane pilot equipped with a quite celestial eyesight would see as he cruised and recruised over the continent of North America. He could hardly get near enough to see bank ledgers, promissory notes, or certificates of capital stock. He would only see the farms, the forests, the mines, the railroads and highways, the rivers, canals, transmission lines; the factories, warehouses, stores, schools, libraries, theatres, golf courses, and homes; and the behavior of some 100,000,000 of men, women and children in relation to these things. Men digging and plowing, pulling the throttles of engines, balancing on steel girders, painting signboards, holding steel under a drill, wrapping up packages, driving trucks, bending over desks, talking through telephones, jamming people into elevated train doors, fishing on the high seas, fighting forest fires, pumping oil wells, reading newspapers, yelling at ball games, sleeping, eating, love making, going to church, dancing, swimming, climb-

ing mountains,—pacing, in a striped suit, through prison corridors. Women, minding spindles and babies and cook stoves, playing Mah Jong, drinking tea, smoking cigarettes. Children answering the school gong, twisting in their seats, rushing through the playground, working in cotton mills, tossing with fever. . . . A vast conglomeration of human activity.

This then is the raw material with which the General Staff must deal. The first step, as during the war, is a survey of requirements. But such requirements instead of running primarily in terms of tons of T. N. T., 75 mm. guns, khaki cloth, Liberty motors, bombing planes and barbed wire entanglements, will run in terms of cubic feet of housing, bushels of corn, pounds of meat and silk, square yards of cotton and woolen goods, schooling space, playgrounds, power lines, surfaced high roads. The General Staff finds by turning to the records of the Council of National Defense—which had already begun the task of calculating national requirements—that the country needs each year approximately: [1]

290,000,000	pairs of shoes.
3,800,000,000	square yards of cotton and silk woven goods.
635,000,000	square yards of woolen woven goods.
95,000,000	dozen pairs of hosiery.
11,000,000,000	pounds of meat.
5,300,000,000	pounds of sugar.

It takes the Department of Labor's minimum budget of health and decency, which is cast in terms of physical commodities for a family of five; and multiplies it out for all the 20,000,000 families in the country, makes the necessary statistical adjustments and corrections, and so arrives at a rough minimum estimate of what must be produced and equitably distributed to keep every family above the

poverty line. On this basis, priority orders are issued to assure the total, to give these necessities right of way over luxuries and nonessentials, precisely as the War Industries Board gave munitions the right of way over country houses and private yachts. In other words, the General Staff sets up a standard of requirements, based primarily on the plain necessities of food, shelter and clothing, but extending, as the war on waste continued, into the realm of comforts as distinct from super luxuries. Somewhere, of course, a line must be drawn between those goods and services which make for biological survival and those which do not. When that line is laid down the weight of the General Staff's influence would obviously be thrown in favor of the production of the former. Certainly its priority orders would permit no manufacture of super luxuries until necessities had been adequately met.

With requirements determined, the General Staff proceeds with a survey of productive capacity. This entails first an examination of existing natural resources in coal, oil, mineral ores, water power, forest timber, soils, fisheries —their location, their prospective yields, their liability to exhaustion, and the terms of their exhaustion; second, the existing industrial plant in terms of factories, transportation systems, warehouses, distribution facilities; third, the existing man-power now engaged—or supposed to be engaged—somewhere along the productive flow of goods and services. What has the nation got in raw supplies, tools, and men to meet the calculated requirements, and so win this war?

The accompanying chart gives a rough picture, both of the flow of goods and services, and of the man-power engaged therein. Starting from the farm, the mine and the

forest, raw materials go into the maw of factories, are there hammered and shaped and compounded; pass over to the wholesaler with his warehouses; to the retailer, and so into foodstuffs, housing and clothing for final consumption. Much of the stream finds its last resting place in so-called capital goods, rather than in goods for consumption—in such things as new factories, machinery, office buildings, bridges, railway tracks, power dams. Much of the stream does not pass along the whole channel, but goes direct from the farm, from the forest or from the factory into final consumption. Farmers eat their own corn, lumberjacks fashion their own camps, factories sell direct to the retailer, to the consumer. Bound up with every movement of the stream on the one side, is the transportation and communication system. It provides both the power and the organization which moves the goods. Bound up with the stream—but not quite so dynamically—on the other side, are the overhead trades and services—professional men, government men, bankers, lawyers, insurance men—who may or may not be cardinal in the case. And in this overhead category we also find the great army which helps to build up the total of consumption by rendering personal service—school teachers, actors, hotel keepers, doctors, ministers, social workers, professional ball players, barbers, boot blacks, butlers, and, at the end, undertakers. An analysis of the 1920 Census of Occupations—with the clerical groups spread among the functional groups listed on the chart—gives the following totals. It is not claimed that these figures represent more than a rough approximation of the total man-power in each group. They simply help to get into perspective the problem of the General Staff and thus set the stage for our whole inquiry into waste.

Farmers and ranchers	10,790,000	
Fishermen	50,000	
		10,840,000
Coal miners	780,000	
Other miners	360,000	
		1,140,000
Lumbermen		230,000
Factory workers	10,000,000	
Hand trade workers	4,150,000	
		14,150,000
Wholesalers		520,000
Retailers		3,600,000
Transportation workers	2,860,000	
Communication workers (mail, telephone, telegraph, etc.)	500,000	
		3,360,000
Professional people—lawyers, doctors, nurses, engineers, etc.	1,140,000	
Bankers and financial people	450,000	
Teachers	800,000	
Personal service—barbers, hotel keepers, domestic servants, etc.	5,770,000	
		8,160,000
Total gainfully employed		42,000,000

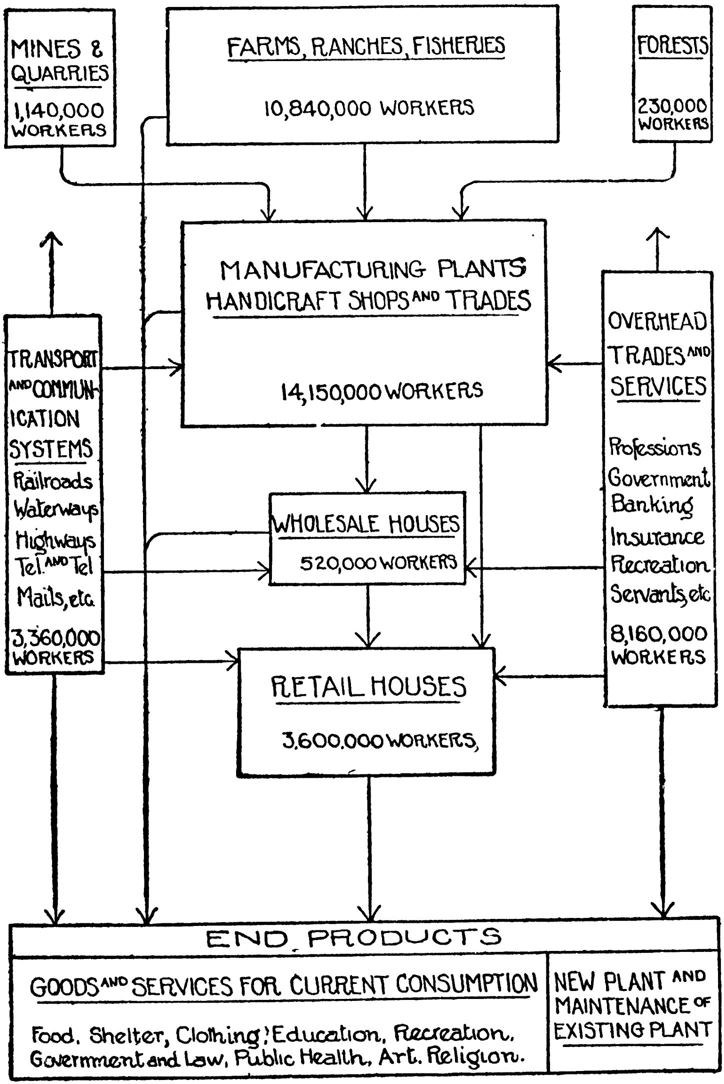
Here are 42,000,000 people more or less gainfully employed—10,000,000 women and 32,000,000 men—a million or more of them children under 15. What are they doing to give the stream of goods and services a maximum output with a minimum of energy? What are they doing that they do not need to do? How much of their output meets no real human requirement? How far are they taking two steps when one would suffice?

The General Staff surveys raw supplies and plant coincidentally with man-power. It finds, among other things—our figures are again only rough approximations:

500,000,000 acres of improved farm land.
110,000,000 acres of grazing land.
464,000,000 acres of forest land.

AMERICAN MANPOWER AND THE INDUSTRIAL FLOW

42,000,000 WORKERS – CENSUS 1920



35,000,000,000	tons of coal unmined.
6,000,000,000	barrels of oil in the ground.
260,000	oil wells.
60,000,000	horse power in streams, capable of development without storage.
250,000	factories.
750,000	retail stores.
250,000	miles of railroad tracks.
27,000	vessels, to a total tonnage of 18,000,000.
50,000	miles of street railway tracks.
300,000	miles of surfaced roads.

And so on, and so on. Mountains of figures, but with a very definite purpose. War figures. How to use this man-power and plant to meet the budget of requirements already set up. In short, how to operate a *functional* society. Mr. R. H. Tawney defines a functional society as one where industry is devoted primarily to supplying human wants, and where profits are a by-product. Our current system he calls an "acquisitive society," where property is a right anterior to, and independent of, function; and where accordingly, production to meet necessary requirements becomes a by-product rather than the main end of economic activity. Or as Dr. Mitchell puts it: "A business enterprise may participate in the work of providing the nation with useful goods or it may not. For there are diverse ways of making money which are positively detrimental to welfare. But it is more important that even the enterprises which are making useful goods to do so only so far as the operation is expected to serve the primary business end of making profits. Any other attitude is unpracticable under the system of money economy. For the man who allowed humanitarian interests to control his business policy would soon be forced out of business. From the business standpoint the useful goods produced are merely by-products of the process of earning dividends."[2]

Our standard for measuring waste must in the end be based squarely on a functional conception of industry. We shall refer to it again and again in the following pages. The Industrial General Staff in its aeroplane survey is concerned with property as an instrument rather than with property as an end in itself. It sees in terms of physical stuff rather than in terms of dollars, and we must look through its eyes. Many leakages will be pointed out which are capable of being abolished—and are in process of being abolished (savings through standardization for instance)—under the acquisitive society. But back of these devices, stand—like a great peak above its foothills—the possibilities of waste elimination and of increased well being in a society organized definitely and relentlessly for its own provisioning. Whether an acquisitive organization can grow into a functional one by insensible gradations, necessitating no economic crisis at all, is a question which is answered with great confidence and finality in both the negative and affirmative. For ourselves, we find no data in the relatively unexplored fields of social psychology to warrant any such finality of judgment either way. We know that waste elimination turns primarily on a functional groupings, but how that grouping is to be brought about is both beyond our knowledge, and the scope of the present inquiry.

We rest our case on the findings of the aeroplane observer acting on behalf of the Industrial General Staff. He sees the industrial structure in physical terms. Money and price, the laws on the statute books, the property lines on surveyor's maps, the findings of the learned economists—are beyond his purview. He sees land, mines, waterways, mills, machinery, houses and men. He sees them moreover not as a single aerial photograph, but as an aerial motion picture—with sufficient time element to note move-

ment and change. Here below us is an able-bodied man peddling opium when he might be growing wheat. His labor is wasted. Here is another walking a wintry street looking for a job; his labor is wasted. Here is another hewing down a forest so ruthlessly that two-thirds of the wood never reaches the sawmill. He is wasting a natural resource. Here is another making coke in a beehive oven and letting most of the by-products locked up in the coal escape into the air . . . another taking twice as long to make a pair of shoes as the present condition of the art of shoemaking calls for . . . another drawing a carload of linseed oil 179 miles from Undercliff to Bayonne, New Jersey, when the direct route is only 13 miles.[3]. These acts are wasteful acts quite apart from price considerations. It is possible to analyze economic activity from this point of view—quite apart from price considerations. It is not the only way to analyze it; there may be better ways to analyze it; but it is the way we have elected to adopt for the purposes of this study. Waste in these premises is based on an objective study of useful function, combined with the engineers's goal of accomplishing that useful function with a minimum expenditure of energy.

CHAPTER III

THE FOUR MAIN CHANNELS OF WASTE

The aeroplane observer sees economic activity. Gifted with a certain amount of common sense, he can immediately recognize some of that activity as wasteful. But sooner or later he will find it difficult to decide whether a given process he is watching is wasteful or not. What are those 600,000 people in the advertising business up to, for instance? And at this point he has to ask himself what he means by waste; what after all is the purpose of economic activity—in short, to make his reports to the General Staff intelligible and consecutive, he must construct a theory of waste. This chapter tries to outline such a theory.

Here are 40,000,000—more or less—of able-bodied adult workers. Most of them are running around doing something, or trying to get a chance to do something. Here is an immense equipment in the form of industrial plant. From the standpoint of a functional society, the relationship of purpose to activity, and of activity to industrial plant is clear enough. There are certain requirements in the form of food, shelter and clothing to be met; above them there are other requirements in the form of comforts and amusements to be met so far as may be. The aim of economic activity is to use the industrial plant in meeting those requirements with a minimum of wear and tear and friction—and if possible to leave enough time over

so that the 40,000,000 may paint pictures or climb mountains to go to the movies or stand on their heads or do anything else that pleases them in their non-economic hours. A housewife tries to get her chores done in the morning so that she may go to a matinee in the afternoon. The more efficiently she does the chores, the better chance she has of seeing Mr. John Barrymore.

There are thus two parts to this theory of waste: the analysis of requirements—as the target at which economic activity aims; and the effectiveness of the production methods by which these requirements are turned out. The observer has got to define requirements, and he must know the present status of the technical arts of production and distribution in order to determine when current practice falls markedly below the standard. With these principles in mind, he can lean over the side of his plane and set down as waste all economic activity which goes into producing things outside the budget of requirements; and all activity which fails to come measurably into line with the technical arts. He will also note no activity at all as obvious waste, and the wanton destruction of good natural resources—coal, lumber, oil, as waste. He thus sees three kinds of wasted man-power—the production of nonessentals, idleness, bad technical methods; and he sees losses (in terms of tonnage or horse-power) in natural resources. That is about all he can see. These four, from the physical standpoint, seem to be the chief elements involved—as we tried to illustrate by the case of the camping party in Chapter I.

The theory of waste is thus fairly simply in outline, however complicated the consideration of its detailed points. Of the 40,000,000 workers, how many are furnishing harmful or unnecessary goods and services; how many are

furnishing nothing at all; how many are taking more time than the job requires because the job has not been organized in line with the technical art of doing it right—and what is the ratio of such excess to the standard time? Of the total man-power available, what proportion is drained off in these three main channels? Of the total raw material wrung from the crust of the planet, what proportion would better have been left alone? These are the questions which confront the areoplane observer, and the questions which we shall try to answer so far as may be in the following pages.

The whole tends to become an engineering rather than a moral problem—although some moral judgments are unescapable in trying to decide what are nonessential goods. There is no occasion for blame or recrimination. There is no occasion for moral indignation. There is no compulsion for constructive suggestions or for outlining a program of waste elimination. Granting certain assumptions—primarily that of functional control—here is a margin of wasted labor and wasted material. Whether that margin is inaccurately described must be left to the judgment of the reader; what is to be done about reducing it must be left to the engineers and the statesmen. The assumptions are not so clear as we would like to have them, and the data on which the measurement of the margin is based leave much to be desired. But in the grip of an enormous and complicated subject, we find that this is the best we can do, and even if our theory fails lamentably in some particulars—as it is bound to—we can only hope that enough solid ground remains to have made the attempt worth while. There are five elements involved in the theory and we will consider each of them briefly in turn.

Human wants

Requirements or wants, according to our theory, constitute the target at which production aims. The philosophy of human wants is a long, involved, and highly acrimonious one. Most economists avoid it altogether. What god or demon shall throw a rope around the things we want and yoke them to the statistician's plow? One man's meat is another man's poison. But is it? We venture to suggest that perhaps 90 per cent by weight of human wants are known and calculable up to the final stages of manufacture. Foodstuffs particularly, with their combinations of proteins, starches, fats and mineral values, apply with reasonable uniformity to all men. Population still goes up and down with the food supply, as Dr. Raymond Pearl has shown.[1] In a less degree housing, fuel, clothing and educational facilities, demand a more or less uniform common denominator in terms of physical output—lumber, iron, copper, coal, oil, cement. It is only when we come to comforts, luxuries, and the arts, that the debate chiefly arises. Here demand differs widely; here one man's meat is often another's poison; and here the doctors most violently disagree. Well and good; let them disagree—remembering that the discussion rages within the limits of probably not more than 10 per cent by weight of the physical output—and remembering this: demand for luxuries, books, works of art, amusement, diversion, is often not so much a matter of individual preference as it is a matter of going style. And style again connotes uniformity.

In Chapter IV an attempt is made to analyze wants in some detail. At this point it is only necessary to say that human wants involving large amounts of economic activity seem to fall under the following nine heads. A sound

theory of waste demands that they be supplied free from adulteration and degradation, and that necessities have right of way over luxuries.

1. Food
2. Shelter
3. Clothing
4. Education
5. Recreation
6. Government and community control
7. The safeguarding of health
8. Religion
9. Art forms

Wastes in consumption

The first great channel of wasted man-power is the production of goods which lie outside the category of human wants. These goods are for the most part consumed, and it is not inappropriate accordingly to follow Mr. J. A. Hobson and call this channel wastes in consumption.[2] We are not concerned directly with the effect on the character, or the lights and liver of the consumer, but only with the amount of man-power devoted to unsettling his character and his internal economy. The number of people converted into drug fiends or made ill by patent medicines is in its way a waste; but what we want to know more particularly is how many industrial workers are bottling, packing, advertising and selling the deleterious product.

Ruskin is perhaps the chief thunderer against waste of this nature. Goods to satisfy true wants he defines as *wealth,* the perversion of wants and harmful products he calls *illth.* "Possession is in use only, which for each man is sternly limited so that such things and so much of them as he can use, are, indeed, well for him or Wealth, and

more of them, or any other things, are ill for him or Illth." [3]

Tawney states the case in this form: "Part of the goods which are annually produced and which are called wealth, is, strictly speaking, waste, because it consists of articles, which, though reckoned as part of the income of the nation, either should not have been produced until other articles had already been produced in sufficient abundance, or should not have been produced at all." [4]

Wastes in consumption, or "illth"—for we shall adopt Ruskin's colorful word—seem to fall into the following main classifications:

1. The military establishment
2. Harmful drugs, narcotics and patent medicines
3. Commercialized vice, and crime
4. Adulteration of food, clothing, housing and other necessities
5. Speculation and gambling—the institutionalized factor only
6. Quackery—sure cures, get-rich-quick performers
7. Super luxuries and their cheap imitation
8. Fashions—the factor of artificial stimulation only
9. Commercialized recreation—in part
10. Professional services—the factor of perversion only

and, as a sort of godfather to them all,

11. Advertising.

This list is not to be considered as a blanket indictment against the activities named. As a rule only a portion of each should, in our judgment, be classed as illth. The Industrial General Staff would be inclined to issue priority orders against production of this nature. Our problem is to survey the man-power which now flows into such production.

There is another aspect of waste in consumption which deserves mention at least—the economic loss due to ignorance or superstition in buying necessities. Buying habits tend to become fixed—apples are bought for their red color rather than for their food value; white bread and polished rice are preferred to the more healthful whole wheat bread and brown rice. New York City demands white eggs, and Boston, brown. Rye bread is less respectable than wheat bread. As a whole the people of the United States eat too much high cost meat, as against the cheaper and more healthful grains, cheeses, fruits and vegetables. If somehow the consumer could be educated to demand the things which tend to give maximum value at minimum cost, a great amount of productive labor might be saved. Mr. Henry Harap in his book, "The Education of the Consumer," has done an immensely valuable service in pointing out in great detail how waste of this nature may be lessened. Such considerations, needless to say, apply only to the necessities—food, shelter, fuel, clothing in part. Above the line of the necessities, human nature seems to be such that economy in production has little to do with the case. One takes a fancy to this and that, and no amount of "consumer education" is going to change that fancy much. One doesn't buy neckties for their wearing qualities, but for the flair they give the personality.

Idle man-power

The most striking and the most constant illustration of this, our second main channel of waste, is unemployment. In the United States it has been estimated that even in the best of times there are over a million persons seeking work, and in periods of business depression, like 1921, the number will rise to five or six millions. The principal losses due to idle man-power include:

1. Seasonal unemployment
2. Cyclical unemployment (business depressions)
3. Residual unemployment
4. Turnover losses (changing from job to job)
5. Strikes and lockouts (time lost)
6. Time lost by preventable accidents
7. Time lost by preventable sickness
8. Absenteeism (just plain staying home)
9. Lost labor of the idle rich
10. Lost labor of the hobo and bum

Wastes in the technique of production and distribution

Ever since Frederick W. Taylor laid down the laws of scientific management nearly a generation ago, American industry has been raked fore and aft from the standpoint of "efficiency." Mr. Hoover's work in the Department of Commerce, and the work of the American Engineering Standards Committee, in which the Department of Commerce actively co-operates, are the direct outcome of that movement. Despite the many blunders of scientific management, particularly in its approach to the psychology of the worker, it remains a great and hopeful movement. From its surveys and reports, a large part of the supporting evidence for this third main channel of waste is drawn. We note this evidence, and pass on to a somewhat wider view of technical waste.

The technique of production and distribution is based on the current status of the arts of engineering, physics, chemistry and administration. A stream can rise no higher than its source, and waste only appears when a given process is carried on at a lower level than the present state of human knowledge warrants. To give a specific instance, the by-product coke oven for the destructive distillation of coal, has proven its worth. The fact that so much coking is still carried on in beehive ovens

which release much of the value of the coal into the air, is a demonstrated waste.

We have to be careful, however, in pushing this conception too far. While it is true that there is enormous waste because the *best* way of doing things is not made use of, the cost of scrapping the old machines and of building the new ones, may often be greater than the savings to be gained. Again, the technical arts are changing so frequently in these years of unprecedented scientific invention, that a machine which represents the sum total of human knowledge today, may be worth so much old iron tomorrow. It is impossible, therefore, to condemn all technical methods which do not measure up to the last word in invention, as wasteful methods. The line of loss and leakage must always run substantially under the ultimate invention. Waste arises only when current practice is clearly and demonstrably below what might reasonably be expected, with due regard for the installation cost of the new process. The method of Mr. Hoover and his colleagues is usually to take the practice of the best plant in the field and compare it to average practice; or to compare average practice with the worst plant.

There is another broad consideration which would give the aeroplane observer no little difficulty in trying to assess the extent of technical waste. How far can output be increased on the basis of the present industrial plant, without change of *location*—"plant" meaning all industrial equipment, farms, factories, transportation and distribution systems? In other words what is the possibility of improving operating methods without large new capital outlays? Some light is thrown by the war experience already outlined. With little change in plant lay-out, broadly speaking, the output by weight per worker was increased some 30 per cent in 1918. This was accom-

plished mainly by rerouting, the elimination of cross-hauling, better plant utilization, in a word—co-ordination of operating processes. We know, then, that there is a reasonably large factor of waste in the technical operation of the present industrial plant as it stands.

But suppose the plant were reorganized and relocated? Suppose manufacturing establishments were placed at the nearest practicable point to sources of raw materials; water ways developed and used for bulky freight; a super-power system established linking coal mines and water power; regional zones instituted; terminal markets rebuilt in accord with straight line operation; the whole system of wholesale and retail distribution co-ordinated and simplified. In this great field we have but little data to guide us. In super-power, the experience of the Province of Ontario with its great hydro-electric system seems to indicate that the annual savings resulting from its introduction would pay the capital cost in a relatively short time. Engineers tell us that there are vast savings inherent in such co-ordinated projects, but the quantitative proof—the balancing of operating gains against capital outlays—is sometimes difficult to come by. Furthermore many of these great projects require too much or too slowly returned capital outlay to be undertaken by the private entrepreneur actuated by the hope of profit. Only the community can tackle them effectively, and in its war against waste, the Industrial General Staff cannot determine how far it may be psychologically possible to push its functional control. One can't uproot the shoe industry of New England overnight, even if the middle west is more economically situated as a shoe manufacturing center. On the other hand, the division of the country into super-power zones seems to be an immediate and practicable proposal. Wasted man-power because of failure to adopt these far flung plans is

a pretty speculative matter. We shall try to use a certain amount of precautionary common sense in discussing them accordingly.

The main items of loss and leakage in this third channel of waste—the technique of production and distribution—appear to be:

1. Co-ordination failures—lack of knowledge as to requirements, lack of community planning for the physical development of regions and cities.
2. Excess plant capacity, duplication of services
3. Restriction of output
4. Commercial failures (bankruptcies)
5. Lack of standardized practices, grades, commodities
6. Bad internal management—shop scheduling, production standards
7. Lack of cost systems; research facilities
8. Secret processes, suppressed inventions

And, in a class by itself

9. Wastes in the technique of distribution—excessive selling costs, duplication of wholesale and retail facilities, cross hauling.

The waste of natural resources

The fourth and last main channel of waste, as we have outlined it, lies in the destruction of natural resources, *over and above the needs* of prudent current consumption. It may be cheaper today to "skim the cream" from big-veined coal, oil gushers, and turpentine forests, but our children and our children's children may pay a bitter price for this saving at the spigot. At the present rate of consumption, engineers variously estimate our oil supply will last from 12 to 20 years. Yet for every barrel of oil which reaches the pipe line, 3 barrels have been wasted in delivery, or left forever unreclaimable underground. Out of our annual cut of 110,000,000,000 board feet of timber, Mr.

Arthur D. Little estimates that 70,000,000,000 are wasted Mr. Floyd W. Parsons, editor of the Gas Age Record, thus summarizes the situation: "The story of the development of life and industry in America is the most amazing tale of the waste of wealth by a careless, improvident people that the world has ever known. We have flooded the air with that wonder fuel, natural gas; covered our land with the ashes of burned forests, killed off our wild animal life for the sport that was in it, and robbed our virgin acres of so much of their fertility that in many of the regions farming as a pursuit is about as obsolete as the spinning wheel."

The following are the chief resources which come under this head:

1. Coal
2. Water power
3. Oil
4. Natural gas
5. Mineral ores
6. Timber
7. The soil
8. Animal life, including fisheries
9. Failure to utilize by-products.

The measurement of waste

Enough has been said to make it clear that man-power and raw materials by weight are the standards by which we shall try to measure the extent of waste in these four main channels. For the first three it is ever a question of the diversion of effort of the 40,000,000. Thus we gain a fixed and definite starting point—the economic activity of the total number of able-bodied producers. It is to be noted that we are concerned with them only as persons "gainfully employed," that is, as units rendering back to society some equivalent for the physical things society renders to them. Into their activities as independent human

beings doing what they want to in their spare time, it would be impertinent to inquire.

Most of the studies made heretofore use money units in measuring waste. Billions are piled on billions before our amazed eyes. Money talks to be sure, but in these premises it is capable of talking as diversely as the builders of the tower of Babel. The shifting price level makes it highly unstable. A waste of a billion dollars in 1913, becomes two billions in 1920. Again it comprehends all products good or bad—a dollar may buy equally ten loaves of bread or a snuff of heroin. It readily lends itself to duplications when measuring two or more industries, particularly when calculated on the basis of the selling value of the product. Thus if the total turnover of the coal industry is a billion dollars, and engineers figure a waste ratio of 50 per cent, the loss is set down at a half a billion. Meanwhile the turnover of the metal trades industry may be three billions, a waste ratio of 33 per cent assessed, and the loss set down at one billion. Is the waste of the two industries combined one and one-half billion? It is not. The metal trades turnover includes the purchase of large stocks of coal on which a loss in dollars has already been figured. To apply the ratio of 33 per cent to such purchases, means duplication. On the other hand, if the man-power of the coal industry is known, and the man-power of the metal trades is known, the ratios can be applied on a more clean cut mathematical basis.

So far as possible in the following chapters we shall try to use either man-power or raw materials by physical count as the measure of waste. From time to time money estimates will be quoted, and occasionally we shall be forced to make man-power estimates based on money totals, lacking any reliable figures of labor employed. Our procedure in the latter case will be to use $2,000 per year as a basis

for dividing the total money turnover, in order to estimate the approximate man-power. While the average wage the country over is probably not in excess of $1,500 at the present time, $2,000 is taken in order to allow for capital charges, and for any criticism that might arise because the estimate might be deemed excessive. Thus if the turnover of the advertising industry is $1,200,000,000; dividing by $2,000, gives an approximate man-power—direct and indirect—of 600,000 workers. But always in such money estimates, the element of duplication with other industries is a danger.

Finally

In the concluding chapters an attempt is made to bring together such quantitative estimates as have been computed in the four main channels of waste, and so arrive at a rough minimum total of man-power and raw material losses. Needless to say, the whole problem is so complex, so many elements overlap and fuse, so uncertain is the human equation, that such estimate can at the best be little more than a conservative guess. The strength of the present inquiry, so far as it has strength at all, must lie in the cumulative total of a description primarily qualitative.

We have no illusions as to the immediate introduction of an economic system based on function rather than on property rights. The Industrial General Staff—whether it be an organ of the political government, a clearing house for producers and consumers co-operatives, the board of directors of a giant private holding company, a chamber of commerce of enlightened business men—such as Mr. Filene foresees, or a federation of industrial unions—will never send forth its aeroplane observers, never look out from its high central tower, until the massed habits and folkways of the present generation have spent their course. Per-

haps the complexities of human nature are such that it will never so look out. Perhaps society at large is incapable of acting with the common sense of a camping party. The extraordinary conduct of the war is our excuse for taking a nation-wide functional viewpoint as a standard for the measurement of waste. Against the threat of the Central Powers—and it was not such an ominous threat as many have been led to suppose—America overcame sufficiently the drive of customary habit, to establish for a year or two, the rudiments of a functional control. Is it beyond all peradventure that the incentive of an even more righteous war may some day create a similar unity and a similar control?

CHAPTER IV

HUMAN WANTS

The first element in the theory of waste which was outlined in the last chapter, was a standard of requirements—a target of sound goods and services at which production should aim. In this chapter we attempt the rough draft of such a standard. We will start it with two quotations, the first from Bertrand Russell's review of the *Dance of Life* by Havelock Ellis, the second from J. A. Hobson in *Work and Wealth.*

"Moralists tend to view life as consisting essentially of work, with only such intervals for rest as are physiologically necessary. Havelock Ellis views life as essentially play, interrupted by the need of a certain minimum of work to secure the necessaries of existence."

* * * * * *

"This 'economic man' is nowhere found. Actual man, as many anthropologists depict him, appears to begin with luxuries and dispenses with the conveniences."

No inquiry into human needs can escape absurdity which does not reckon with the fundamental truth of these observations. Kroeber holds in his *Anthropology* that ornament probably came before clothes. First the necklace of bone, then the shift of leather.

But, lest non-utilitarianism run away with the argument, Ruskin is to be heard on the other side: "And neither with respect to things useful or useless can man's estimate of them alter their nature. Certain substances being good

for his food and others noxious to him, what he thinks or wishes respecting them can neither change nor prevent their power. If he eats corn, he will live, if nightshade he will die. If he produce and make good and beautiful things they will recreate him, if bad and ugly things they will corrupt and break him in pieces, that is, in the exact degree of their power, kill him." [1]

If all consumers were reasonably well educated, if all had roughly equal purchasing power in the market, if the goods and services offered for sale were free from adulteration and defect, it might well be impertinent to make inquiry at all into human wants. One would accept what the consumer demanded as the real criterion. But the consumers are not educated for their own protection against deleterious goods, they have not equal purchasing strength in the market, and are thus led to buy cheap imitations of the goods held by their economic superiors; adulteration and quackery are rampant, the modern advertiser has developed a technique of artificial stimulation which would make Cleopatra blush; and finally the very number and complexity of goods for sale today, make it impossible for the consumer to test and value what he buys. He must, in most instances, take somebody's word for it—and three times out of four it is the advertiser's word. In these circumstances perhaps our inquiry loses something of its impertinence. An appraisal of genuine human wants, as distinct from the goods and services currently sold and delivered, has real value in contributing to the theory of industrial waste.

For the skeptical, however, who hold that human wants are incapable of definition—that good things cannot be set off from bad things without the exercise of an intolerable moral censorship—this chapter can be skipped and the category of illth, as a legitimate element of waste, alto-

gether waived. This does not destroy the whole thesis by any means, it simply eliminates one of the four factors in the inquiry. To some of us, despite the manifest dangers and difficulty of the subject, there is a case to be made, and waste to be measured, in the distinction between worthwhile products and useless or vicious ones. Is the stupendous energy which now goes into the military establishments of the several Christian nations all to be counted as socially necessary and desirable? Does the opium traffic fulfill a manifest destiny? Is all the tumultuous extravagance of the rich—particularly the newly rich—to be set down as useful and wise? Are the worthless patent medicines which the gullible consume; the quacks and the charlatans and the fakers with their sure cures, their messages to the departed, and their double-your-money-in-a-week devices—all to be classed as catering to human necessity? Despite our desire to let people have whatever their habits have accustomed them to demand, we must with Ruskin run a zone—it cannot be anything as fine as a line—between those products and services which seem to be in accord with the good life, and those which do not.

The first thing to guard against in any attempted definition of wants, as we have seen, is strict judgment on the basis of utility. Man does not live by bread alone. Much that he wants fulfills no utilitarian purpose at all—tea, tobacco, and gambling for instance. Much that he wants can only be secured by *increased effort,* over and above the utilitarian standard. Men can live and keep perfectly healthy on a meatless diet. In making a pound of beef, ten times as much food value of corn is consumed as the beef contains. In other words ten men could live on the corn where only one can live on the beef. The economic waste is enormous from the utilitarian standpoint. But the naked fact remains that most people in Western civ-

ilization demand meat, and to write off the difference between the beef and the corn as waste would be, from the practical standpoint, irrelevant. Vegetarians can amuse themselves with these statistics, but they do not enter the computations of economic waste so long as the habits of the majority of the population demand a carnivorous diet.

Why do shop girls buy silk stockings when they are short of warm underclothing? Why do we buy hats like the Prince of Wales' when we already have a good hat? Why do we buy hats at all—in temperate climates they serve no utilitarian purpose, and their stiff bands probably account for much baldness. Why, in fine, do we demand such an unconscionable quantity of nonutilitarian goods simply in keeping up with the Joneses? Consider the motor car mania, the radio, the flat silver, the dinner coat. All waste from the utilitarian standpoint. But human nature is such that it demands to keep up with the Joneses—particularly in democratic countries. The individual ego quails before the ignominy of falling below the standards of the group. Death is better than overalls at a dinner party, or a checked cap at a reception by the King. The vast hold of tradition and habit and social custom must be regarded in any study of wastes in consumption, which is not to become ridiculous. The elements to watch are artificial stimulation, and that factor, due to the inequality of purchasing power, which makes one economic class, for its own self-respect, imitate the foibles of the class immediately above it. Veblen has founded a whole philosophy of waste on this latter point and called it the *Theory of the Leisure Class.* When a little group of designers in Paris, bent on making themselves rich as speedily as possible, attempt to dictate the maximum rotation in women's fashions so that sales will be increased, and good textiles discarded within a few months,—real waste in the form of illth makes its appearance. When

the whole drive of modern advertising is subtly directed toward the shifting of purchasing power from sound necessities to superfluities; when a leisure class flouts its power in the form of conspicuous consumption, and forces its economic inferiors to spend in cheap imitations what they need in sound essentials,—an element of social loss must be reckoned with.

Individual Physiological Wants

What are the bare essentials which all individuals in all countries at all times have required—the lowest common denominator of healthy biological survival?

Food and drink, the former in proper proportions of proteins, starches and mineral values.

Shelter for warmth and shade and the deepseated feeling of a hearthstone, a home.

Clothing for warmth and protection—in certain climates only.

Love, for the perpetuation of the species and for comradeship.

Play—involving rhythm, activity, release.

Curiosity—freedom to investigate, manipulate, explore, the beginning of organized knowledge.

These physiological wants are close to the wants of the higher animals, except that the factor of instinct is less developed in man, and more creative intelligence has to be used in adjusting the individual to his environment. Nature has not been so generous in furnishing gratis protection against climate as in the case of the animals. These wants are basic; no individual can long remain normal without giving expression to most if not all of them, but they do not complete the picture. Man is a social animal. Modern anthropology has exploded the myth of the cave dweller living for himself alone, and, like the tiger, at war with all of his kind. It is probable that ever since *homo sapiens* was thrown off from the evolutionary stem, he has

lived in groups and clans and tribes; sometimes very small, often at war with all other groups, but never, normally, as an isolated individual or family. And so to gain a truer picture we must add the wants which group living have enforced since time out of mind. We think anthropologists will agree that the following list is to be found in every group, no matter how primitive, of which record is known.

Social Wants

Language

The development of communication and the establishment of a body of knowledge passed down from generation to generation is the trait which sets off mankind most definitely from the animals. The tradition of knowledge rapidly institutionalizes itself as education. The sayings of the wise men, of yesterday, become the schools, the universities and the research bureaus of today. The free swing of intellectual curiosity leading to organized knowledge is perhaps the most precious of all man's wants. One has only to be with an unbroken child an hour to realize its depth and intensity.

Religion

The worship of some power beyond human agency is a cardinal group want. No primitive tribe has ever been found without a well-marked religious tradition.

Government and law

These social wants are also implicit in group living. Certain remote tribes go about their daily tasks with a minimum of state interference; other tribes, equally remote, have a very complicated system of state control. Law may be written or unwritten, but it is always in evidence. The form of government has wide variations from race to race and age to age. In America north of Mexico before the

white man came, we find in the Indian tribes only two monarchies amidst a host of free democracies. Hereditary rulers, elected rulers, priestly rulers, women rulers, magician rulers—every kind and every variety, but always there is found some sort of an authority to give head and direction to the group; to wage war, to maintain custom, to arbitrate internal disputes. It is to be noted in passing that no community has ever carried private property to the lengths now obtaining in Western civilization. Property seems to have always been safeguarded in personal effects like clothing, ornaments, weapons, and tools, but property in intangibles such as stocks, bonds and evidences of indebtedness is a metaphysical abstraction with which the realistic minds of other peoples have been loath to cope. What would Plato have made of the joint stock company?

Art forms

No group is found without some vent for artistic expression. Dancing, singing, chanting, story telling, folk tales, are practically universal, as is design in connection with pottery and textiles. We find the Cro-Magnon man etching buffaloes upon the walls of caves in southern France 20,000 years ago. Architecture is an ancient and almost universal art; poetry even more ancient.

Sports and organized play

This is a need so patent that it calls for no elaboration. It includes outdoor and indoor amusements, the circus, the movies, the radio, the hobbies of collectors. From the Olympic games at Delphi to the Olympic games at Paris, group games have marched down the centuries. It is debatable, however, if the commercialized sports of today have not artificially restricted the number of participants and inflated the number of spectators to the damage of each. It is fun to watch but it is even more fun to play.

There is more money to be made from watchers than from players, and perhaps as a result we watch too much. Possibly this need could be better satisfied biologically if more of us were players.

As a corollary to sports and games, we find forms of gambling very widely dispersed in every age and tribe. This seems to be a legitimate want in consequence. But here again friendly wagers between spectators and players are a very different thing from the highly organized, highly commercialized gambling institutions of modern culture—horse racing, stock markets and grain pits (in the purely speculative sense), Monte Carlos, baseball pools. "The roulette table pays nobody except him that keeps it. Nevertheless a passion for gaming is common, though a passion for keeping roulette tables is unknown."[2]

Medicine and health

There is no group without its doctors and medicine men. In some cases medicine, magic and religion are inextricably commingled—as among the Melanesian Indians of the Banks Islands, or Christian Scientists. Medicine and the care of the health is a fundamental group want. And it is by no means clear that the allopathic school is the only legitimate custodian of this want. There remains still much to be said for Christian Science and for theosophy. But nothing at all can be said for those charlatans who knowingly and designedly capitalize human credulity in the form of noxious patent medicines, "electric treatments," and crystal gazing diagnoses. (For the quintessence of waste in this category there is nothing to approach the exhaustive study of a patent medicine which H. G. Wells has made in *Tono Bungay*.)

Family and sex customs

These group wants represent the strongest of all habit

patterns. They are found in every primitive tribe. The Australian bush fellows—perhaps the lowest of all existing races—are said to have the most rigorous known system of sexual taboos. Such wants do not, however, involve a great deal of economic activity and are largely outside a purely economic study of waste.

Narcotics

This is a puzzling and curious category. One's first instinct is to banish it as a legitimate want and write the total off as waste. But that bracing cup of morning coffee, that tea on the shady terrace, that stein of dark Munchener beer, that pipe around the camp fire! Whatever ravages they may effect on the body there are compensations in the spirit. Perhaps not adequate, but still compensations. The writer has a theory—doubtless quite without foundation—that in a society planned and controlled for maximum well being, there would be so many interesting things to do, and so much thrilling experience to be lived through, that narcotics would slowly lose their hold and ultimately vanish altogether. In such a society, they might well be classified as waste in toto. But in our own dark ways, our uncertainties, insecurities and periods of restlessness—these things do offer a certain release, a certain balm to uneasy hearts. It is difficult to find a people without its alcohol, tobacco, or betel nut. The craving is deeply grained. I doubt, as matters now stand, if the labor power which goes into the production of narcotics—and an immense total it is—can be classed out of hand as waste. Perhaps all alcohol over wines and beers, perhaps much tobacco smoking particularly of advertised cigarettes, certainly all varieties of opium smoking, is sheer waste. But tea and coffee take their embattled stand, and there, fragrant and steaming, we shall have to leave them.

In the above we have a fairly tangible category of wants

—both individual and social—which are to be found amongst all people in all ages. The group wants of western civilization differ only in classes of goods, not in principle from those of other civilizations. All rise from the same roots in human nature. The waste of illth appears not with nonutility but with surfeit, adulteration, artificial stimulation, deliberate capitalization on the part of the coterie bent on money or power—or with just plain stupidity. Not many of us know what we want in the sense that we know what our basic natures crave, and in the restless experimenting, much waste occurs. Every category of wants requires economic activity in the form of goods and services, some far more than others. While our chief concern is with those which demand large economic output, we may be pardoned for trying to make a classification as inclusive as possible. In recapitulation, the following table may prove helpful:

Want	*Economic Activity Involved*	*Indicated Wastes in Consumption*
1. Food	Enormous — probably the bulk of human labor.	Adulteration, super elaboration.
2. Shelter	Enormous—lumber, steel, stonework, house furnishings, decoration.	Jerry building, congestion, super elaboration.
3. Clothing	Enormous—cotton, wool, silk, leather, furs.	Shoddy. Fashions artificially stimulated, super elaboration.
4. Language and Education	Considerable—schools, universities, lectures, books, postal service, telephone, telegraph, scientific papers, magazines.	Propaganda instead of facts; advertising matter, in part.

Want	*Economic Activity Involved*	*Indicated Wastes in Consumption*
5. Recreation	Large—baseball, football, yachting, horse racing, prize fighting, motoring (in part), radio, movies, vaudeville, dancing, house parties, travel, camping, bridge, pool and billiards, golf, gambling devices, toys, collections.	Artificial stimulation through excessive commercialization.
6. Government and Law	Enormous — military establishments, police, courts of law, civil service, foreign relations.	War (among peoples of similar culture). A good deal of property law.
7. Health Provisions	Considerable — hospitals, clinics, watering places, dental services, drugs and medicines.	Quackery.
8. Religion	Considerable — churches, cathedrals, colleges, charity organizations, books, tracts, musical instruments.	Quackery.
9. Art Forms	Considerable — theatres, opera, concerts, art galleries, art schools, literature, architecture, musical instruments, classic dancing.	Excessive commercialization.
10. Love	Small—florists, gift makers, jewelers, tailors.	

These ten for all their overlapping may perhaps stand as a rough category of human wants. Insofar as economic activity is directed to such ends, it is not wasted in purpose—whatever may be the waste in technical method. The waste of illth arises when adulteration, corruption, quackery, artificial stimulation, excessive commercialization and super-elaboration creep in.

So we drive our zone. And who shall judge when art is crippled and when free, when fashions change faster than they should, when war is necessary and when it is not, when sports are overcommercialized, and when therapy descends to quackery? God knows. There is no formula. Experience and common sense are the only arbiters. It is safe to say that no two individuals would ever quite agree on what is wealth and what is illth. In the right hand column of the chart we have indicated what seems illth to us. In the following chapters we will consider these items in some detail, and leave the reader to decide in what respects our judgment is at fault.

CHAPTER V

WASTES IN CONSUMPTION, OR ILLTH

The ignorance of the consumer

There is room for improvement in consumption in two general directions—first, the abolition of vicious, harmful and unnecessary products; second, more intelligence in selection among the genuinely good products. The former may be illustrated by labor-power lost in the production of useless patent medicines; the latter, by buying rosy cheeked apples (with cotton wool filling), when green or yellow cheeked apples may have twice the food value. By and large this chapter will be devoted to the patent medicine aspect—to illth pure and simple, but no treatment of wastes in consumption would be complete without a word at least as to what might be saved in human energy, if consumers had more knowledge of what was good for them. This applies, of course, only to the necessities—foodstuffs primarily. In the realm of comforts and the arts, any attempt at "consumer education" as was pointed out earlier, touches the absurd.

Of all cereals eaten in America, oats have the highest composite food value, followed by barley, rye, corn, rice and wheat. Yet the consumption of these cereals follows almost precisely an inverted order. Wheat is the main cereal consumed, followed by corn, rice, rye, barley and oats. Wheat bread is a habit; oatmeal, and oat products, until recently, have been thought only fit for animal con-

sumption. Yet the composite human food value of oats (weighted for both calories, and protein, phosphorous, calcium and iron content) is 2245 as against 1372 for wheat. The cost of 100 calories of oats is 34 cents; of 100 calories of wheat 48 cents. Now this does not mean that we should all give up wheat and take to oats. It simply means that if consumers knew more about food value in relation to cost, many would undoubtedly use oat products more and wheat products less. Oatmeal is extremely high in carbohydrates, proteins, fats and mineral salts. Yet until 1918 not more than 2 per cent of the oat supply of the country was milled for use as food. Corn meal has a higher composite value than fine wheat flour and is the least expensive of the cereals. Yet only 10 per cent of the entire corn crop is used for human consumption. In the country at large, legumes, vegetables and fruits are underconsumed as against meats, sugars and fats—which tend to be overconsumed. Too much is spent for meat and too little for dairy products and eggs. The City of Rochester consumes only half the amount of milk necessary for good health.[1]

If the advertising which is now used to block any changes looking toward more economical food habits (*e.g.*, the advertising of the meat industry) was transformed into a great campaign to educate consumers in maximum food values at minimum cost, the saving of effort in production and distribution, to say nothing of greater vitality and health, would undoubtedly abolish a large margin of waste.

Dr. Carl L. Alsberg has worked out in some detail the diet for America (in animal products and cereals) which would give the maximum of food value with the minimum of effort. Granting a demand for milk and some meat, he finds that an agricultural program which specialized on low cost cereals, with beef from range cattle, veal from male calves, mutton as a by-product of wool growing, fish, and eggs

from foraging hens—(thus feeding no grains to meat animals at all)—would achieve the desired results. "It is clear that the resulting national gain in saved labor-power would be very great indeed." An inspection of his tables reveals the fact that about one-half of all man-power now going into agriculture could be eliminated on this basis—cutting the national food bill approximately in half with *no loss*—but rather a gain—in nutritive values.[2] Such wholesale speculations, however, run somewhat beyond our immediate considerations. The American people are not going to change their food habits in a hurry, however much waste they might eliminate by doing so. We make the point that there is a margin of loss due to the consumer's ignorance, and pass on to the more obvious forms of wastes in consumption.

The production of illth

Ruskin, using the illustration of a national storehouse for the exchange of all home manufactured products, gives us an imaginative picture of illth: "Here is good corn, silk and wine, and here is gunpowder. All have equal money value and the nation rests secure in its statistics of wealth." But the inventory of gunpowder gains, and one day the holders of orders against the storehouse discover that "no amount of currency will command anything Festive except Fire. The supply of rockets is unlimited, but that of food, limited, in a quite final manner; and the whole currency in the hands of society represents an infinite power of detonation, but none of existence."[3] Here Ruskin forces the case against illth to a *reductio ad absurdum*, but now and again it should be so forced. The economic fallacy as to the benefits of "keeping money in circulation" and "making work" needs repeated correction. If one spends $50,000,000 building a pyramid the size of Cheops for

one's last remains, the popular verdict is that one is benefiting the community by providing employment. Suppose, however, that you gained possession of the bulk of the nation's free income, and set the majority of the population to work building, not one, but 500 pyramids. There would be money enough and more in circulation, but there would be nothing to eat, for the simple reason that all the food producers would be hoisting stone. From the standpoint of the functional society, labor devoted to ends which meet no human want, is always and forever waste.

Purely parenthetical

We knew a young man once who got hold of the conception of illth at an impressionable age. He was employed in the office of a firm of certified public accountants doing a general commercial practice. One day he would be on the books of a shoe factory, the next day on those of a city government, or a distillery, or a transit company, or a drug concern. In one year he worked for 51 different clients according to his time sheets. With Mr. Ruskin in one hand and his time sheets in the other, he tried to divide his year's work into that which helped to produce wealth as against that which helped to produce illth. Of the former he found 30 cases; of the latter 12, leaving 9 in which he could come to no conclusion. But what he could conclude was that he had wasted at least a quarter of his year on the 12. He showed his chart to a member of the firm—thus disclosing his appalling naïveté—and suggested that the firm discontinue engagements with the producers of illth. His superior was not impressed with this suggestion. "Do you think I'm a church warden; do you think I'm in business for my health!" he said, as he pounded his desk. And he gave the young man some sound advice as to how to get on in the world.

The young man was abashed but not entirely defeated. He took his chart to certain friends in a social settlement whose reception was more kindly. Together they drew up a "white list" of investments. The object of the list was to put it into the hands of philanthropists, with the suggestions that when making investments, only those concerns which dealt fairly by labor, and whose output was wealth rather than illth should be patronized. With the list in hand, certain trustees were interviewed. "This looks like a plain boycott to me," said one genial philanthropist as he tossed it into the waste paper basket. "I can get 20 per cent from my distillery stock, and you would have to close the summer outing camp if I transferred," said another reliable trustee.

In due course the young man found that the work-a-day world is not interested in the waste of illth. The questions at issue were, in their order: Is the undertaking profitable; if profitable is it legal; if illegal, where can I find a good lawyer? From the purely business standpoint this chapter is a waste of time.

Consumption wastes

We desire to make an objective study of wastes in consumption—a study divorced from all sentiment, and all moral judgment. But we find that it is impossible, and it had better be admitted here and now. We will be as objective as we can, but moral judgments will inevitably creep in. The author has to confess that he hates war, that he has no longing to bomb a city from the skies, that he has no proper grievance against other nationalities and races. He does not want to be a safe breaker, or have his son add to the man-power of crime. He has certain scruples about prostitution, and no desire at all to be infected with venereal disease. He is bored with swank and

super-ornamentation which many seem to like. He hates to be taken in by a slick salesman, he is profoundly distrustful of most advertising, and billboards along a country road make him long for an acetylene torch. He has no faith in patent medicines, in Oom the Omnipotent, or in the spook parlors of Los Angeles. He has no wish to snuff heroin, and he once lost five hundred dollars in marginal dealings with North Butte—despite the assurances of his broker. He is very fond of playing games, but too much watching wearies him. He has some notions about professional honor, and objects to fees taken on a contingency basis. From bitter experience he is never sure when he buys a thing whether it is going to wear well or go to pieces. He wonders if he can ever find again a brand of nails which will not crumple up when they strike hard wood. He wishes styles in men's clothing would shift from the more mortuary varieties to something nearer the color and design of the Renaissance. He is content to explore Coney Island once in every five years.

Obviously an author with such predilections, whatever his devotion to objective fact, cannot outline the wastes of illth with a truly unbiased hand. Some of his private judgments are bound to intrude themselves. Thus he will land between two stools. The reformers will scorn him for not striking out boldly enough—particularly against their own pet dragons. The cynics will exclaim: "This chap wants a white-tiled Puritan world!" So with crossfires from left and right he begins.

The Military Establishment

The costs of the Great War

The known dead in the Great War numbered 9,998,771, the severely wounded 6,295,512, the otherwise wounded

14,002,039, the prisoners or missing 5,983,600. A conservative estimate of the latter indicates that at least half the total are dead men, blown into unrecognizable fragments, and so missing. The total dead are thus 12,990,000. Of the wounded, 9,032,000 or 44 per cent were ultimately restored to normal; 10,555,000 suffered a permanent reduction in ability; 710,000 were totally disabled for life. The total casualties of all kinds reached 33,288,000.

The influenza epidemic in 1918, due primarily to war causes, killed 10,000,000 people. Famine killed 800,000 in Roumania; 1,000,000 in Serbia and Austria; 2,000,000 in Russia. Of Poland, in 1916, it was said that one-third of a generation, the youngest, had ceased to exist. Germany lost 813,000 civilians from war causes. Over 100,000 civilians died on the high seas from mines and submarines.

The cost to the Allied Powers in money was $125,737,000,000, to the Central Powers $60,643,000,000, a total of over $186,000,000,000.

In France 8,000 square miles of agricultural land, 1,200,000 acres of forest land, 900,000 buildings, 6,445 schools, 1,200 churches, 377 public buildings, 4,400 factories, as well as railway lines, bridges, power plants and coal mines were laid waste. The destruction was repeated in Belgium, Poland and East Prussia. The total property loss is estimated by Bogart at $30,000,000,000. Over 3,000 good ships, costing $7,500,000,000, to an aggregate tonnage of 15,398,392 found their last resting place on the bottom of the ocean. The decrease of births under normal during the war, was in England 500,000, in Austria 1,100,000, in Hungary 1,500,000, in France 833,000, in Germany 2,600,000.[4] Meanwhile "enough nitrogen was thrown away in some indecisive battle on the Aisne to save India from a famine."[5]

America's military outlays

The Revolution of 1776 cost	$ 504,000,000
The War of 1812	246,000,000
The Mexican War	195,000,000
The Civil War	13,188,000,000
The Spanish War	1,015,000,000
The World War	28,832,000,000
Total U. S. Treasury Cost[6]	$43,980,000,000

In the 131 years from 1789 to 1920, the United States Government expended $66,000,000,000, of which $53,000,000,000 or 78 per cent were for wars and the military establishment.[7] For the year 1920, Dr. Rosa of the Bureau of Standards, made the following analysis of the federal budget:

Expenditures for past wars	$3,855,482,000	68%
Expenditures for future wars (present military outlays)	1,424,139,000	25%
Total for war	$5,279,621,000	93%
Expenditures for civil depts.	$ 181,087,000	3%
Expenditures for public works	168,204,000	3%
Expenditures for education and science	57,094,000	1%
Total for peace	$ 406,385,000	7%
Total government expenditures	$5,686,006,000	100%

Ninety-three per cent for wars, past and prospective, and one per cent for science and education!

The present (1925) strength of the army and navy is about 250,000 officers and men. The man-power involved, in the form of government clerks and munition workers for war outlays of all kinds, probably reaches 500,000, on the basis of Dr. Rosa's figures. (Dividing the $1,400,000,000 for future wars by $2,000, and deducting the army and

navy strength.) All the past war outlay is not interest and pensions, and it too must involve considerable clerical labor. Perhaps a million workers contribute to the upkeep of the military establishment today. Meanwhile the methodolgy of scientific killing advances so rapidly that battleships may be antiquated before they have left the ways. Germany in 1922 purchased 30 British battleships to break up for scrap metal in her industries. They cost the taxpayers of England £15,000,000, and Germany bought them for 3 cents on the dollar.[8] Heligoland, Germany's Gibraltar, took 24 years in the building. It cost $175,000,000 to make this mountain of massive masonry and the two gigantic moles which formed the artificial harbor. The Treaty of Versailles ordered it dismantled. To destroy the harbor alone took 60,000 feet of holes for blasting, and 300,000 pounds of high explosives. Two hundred thousand cubic yards of concrete, brickwork and masonry were blown to fragments. Guns large and small were reduced to scrap metal with acetylene torches. . . . Untold man-power to destroy what untold man-power had built.

That armaments should be classified as an economic waste will arouse fierce resentment in those hearts which look upon the army and the navy as the backbone of the national life. For ourselves, with all due respect to the instinct of pugnacity—as yet unisolated—we feel that modern warfare has achieved a technique of mechanical, long range death and destruction which places it beyond the capacities of civilized peoples—or of any peoples—to endure. If the various proposals for its elimination as now contemplated by the League of Nations, the World Court, the Outlawry of War group—can be made effective, close to a million workers in America will return to productive occupations.

Drugs

The Opium Traffic

Opium has its legitimate medicinal uses. Beyond this, its consumption constitutes one of the most evil blights with which mankind was ever cursed. The traffic has had a long and stormy history. A century and more ago, the British made poppy-growing in India a government monopoly. After the chests were sold at Calcutta auction, the government took no official cognizance of where they went. Opium leaked into China for years, where, added to by the local crop, it brought to ruin a large fraction of the population. When in 1839 the Chinese government finally roused itself to stop the traffic—and held a sort of Boston Tea Party with 20,000 cases in the harbor of Canton, England promptly declared war, and forced the "Treaty Ports" to deal in opium again. A second opium war was fought in 1858. In 1907, however, England assisted the Chinese Government in reducing the evil. Poppy-growing is still a government monopoly, however, and the finished product is still sold at public auction in Calcutta. Chests are still leaking into China, and into all other parts of the world. Much leaks into the United States. Drug addicts in New York City alone are variously estimated from 10,000 to 100,000. The U. S. Public Health Service estimates 200,000 addicts the country over, but this figure is based on known and tabulated importations. Much incoming opium necessarily escapes official tabulation.[9] A committee appointed by the Secretary of the Treasury after surveying all available data, estimated that the total number of addicts in the country exceeded one million. The total spent for opium and cocaine probably reaches $100,000,000 a year.

While no figures are available, it is safe to conclude that a considerable man-power, from the poppy farmers

of India and China to the "snuff" peddlers in New York, is engaged in this sinister traffic. To this number, the British government adds its due quota of civil servants. The League of Nations has recently devoted a series of special sessions to the worldwide menace of opium and the possibility of its control, but the commercial interest involved has so far blocked any genuinely remedial action.

Patent medicines

The current value of the drug trade in America is placed at $800,000,000. In 1850 there were 6,139 apothecaries and druggists in the country; today their number exceeds 49,000. A fairly well stocked wholesale drug house now carries from 45,000 to 60,000 separate articles, and a retail drug store from 8,000 to 12,000 articles. In 1871 a leading Chicago wholesale house listed 825 proprietary patent medicines. The number listed today is more than 50,000. "The complexity of the problem of distribution of the products of these establishments is not so much in the quantities or value, but in the great variety of commodities each producer turns out. As competition grew, manufacturers duplicated or attempted to duplicate the products of each other, thus adding to the number of items which the retail drug trade had to handle."[10]

Of this great trade of $800,000,000, entailing the labor-power direct and indirect of probably 400,000 workers, what ratio shall be written of as illth? There is much which the corner drug store has to sell that is not illth at all, but very useful wealth. There is much that the functional society would be at pains to distribute even more widely. But with all due allowance for necessary and useful drugs, there still remains an immense area of useless and sometimes vicious production. In this area, patent medicines are the chief offenders.

"Most of them are 'charms,' invented by medicine men. A whole magical pharmacopœia has been erected upon the basis of totemist and animist belief, mingled with circumstantial misconceptions and gratuitous fabrications." [11]

Dr. Paul H. DeKreif has stated that of the 45,000 remedies in the field (1922), not more than 50 are really necessary in the treatment of disease. The definitely curative items upon which the whole fabric is based, do not number more than a dozen.

Modern advertising had its birth in the patent medicine industry. It is still trying to live down its antecedents. The economic theory involved is this: "A man will buy only two or three boxes of pills which can and do really cure him of an ailment, but he will continue to buy for years those remedies which never do him any good." [12] Keep 'em coming, but never quite cure 'em. For to cure them would have an unfortunate effect on sales. There seems to be no limit to the gullibility of mankind in dosing internal complaints—a gullibility which, as Hobson points out, is not confined to current times, but enriches all the records of anthropology. And on this gullibility the astute patent medicine man trades—backed with all the science of modern advertising.

The British Medical Association, in a publication entitled "Secret Remedies" made an exhaustive analysis of the principal nostrums. It concluded that the majority were valueless while some were actively harmful. It found a cough mixture costing one-third of a penny to make, selling for 2s 3d; another costing one-thirteenth of a farthing, selling for a shilling. It found an "electric fluid for cancer" and another cancer cure composed of water diluted with impure alcohol. A bill for government regulation was recommended at the time (1912), but nothing has been done to date (1924).

"Come with me to any hospital," writes Dr. Goldwater, "and I will show you bed after bed where it stands proved that the patient advanced from the first stage of tuberculosis to the third by placing faith in patent medicines which did not contain a single helpful ingredient." [13]

A black capsule advertised as a fat reducer was recently investigated by the New York State Department of Health. It was found to consist of a coating of gelatine in which was imbedded the head of a tape worm. Instructions were to take one a week. The Department identified a number of deaths from pernicious anæmia as a result of the taking of flesh reducers consisting largely of epsom salts—a drug which taken in excess eventually breaks up the red corpuscles of the blood. A "rejuvenator" guaranteed to restore youthful vitality rode to success on the recent gland transferring wave. It sold for $15.00 a bottle and consisted of epsom salts combined with a little white vinegar, to a total cost not exceeding 25 cents per bottle. Cancer cures have lately been analyzed to contain ashes of snails, clam shells and yellow clay. A mange cure was bottled and sold as a hair tonic, resulting in many infections.[14]

In justice to the industry it should be pointed out that times have changed since the heyday of 1907. Prior to the passage of the Pure Food and Drugs Act in that year, there was no limit to what a vendor of patent medicines might do or say, except his own conscience—a commodity somewhat difficult to locate. This act, plus the Shirley amendment, plus the Anti-Narcotic Act of 1915, has introduced certain economic changes. A great deal of plain lying on labels and doctrinal matter has disappeared. Cocaine as an ingredient has been greatly reduced. Alcohol and morphine still flourish, however.[15] There are today 64 patent medicines whose chief function is to soften the effects of the

Prohibition amendment, according to Dr. A. J. Cramp of the American Medical Association. By and large the American public has begun to weary of the old charms, and Pink Pills for Pale People give way to Sanatogen, Systo, food tonics, and gland compounds. The older remedies now find their chief markets abroad—particularly in South America. The domestic consumer demands to be fooled along more scientific lines.

One of the first and easily the most successful of the offerings of the new school, was Sanatogen, 95 per cent casein and 5 per cent glycerophosphates. "A few cents' worth of dried cottage cheese with a minute amount of discarded and therapeutically valueless drug was sold for a dollar, and for this dollar one got a product whose only virtue was its food value—and that was equivalent to the value of two cents' worth of dried beans.[15] It was launched on the crest of an advertising campaign whose very impertinence was so stupendous as to command admiration. The appeal was especially to the intelligent—the copy was dressed to give an air of the laboratory, the clinic, the surgeon with his instruments in white smock. It all dovetailed with openwork plumbing, white tiled bathrooms, germless sheets. Main Street still had a weakness for kidney pills, but Floral Heights fell before this onslaught with a loud crash.

One difficulty with this new economic shift, however, is that the whole burden now tends to fall on the advertising. Lacking a habit-forming "repeater" element, these scientific nostrums collapse if the advertising is not maintained at high pressure. They lack an inner momentum. But as medicine and biology are throwing out new discoveries in glands, serums and dietetics at an unprecedented rate, the opportunities for capitalizing these discoveries through

advertising the rejuvenating power of dried testicular matter, remain bright and very profitable. Meanwhile Buenos Aires consumes unheard-of quantities of Peruna.

No, for all the federal laws, the industry does not yet languish. Of the 400,000 workers, direct and indirect, engaged in the whole drug industry would it be wide of the mark to say that the labor of a quarter of them or 100,000 is wasted in noxious patent medicines. The 400,000—as in all estimates based on money volume—include not only the chemists and bottlers and drummers directly employed, but the miners, railway men, lumber men, paper makers, glass workers, printers, druggists—whose work helps to supply the industry with raw materials, or helps to move or to finance the product.

Alcohol and tobacco

These two great industries probably fall under the head of drugs. In respect to the former, we incline to the view that all economic effort directed to the production of raw spirits—whiskies, brandies, gins—of over say 10 per cent alcoholic content, is probably wasted effort—that mankind loses more than it gains from consumption in these high latitudes. For beer and wine there seems to be an age-old demand, and, despite the vehement protests of the embattled forces of temperance, we cannot add them to our balance sheet of illth. Previous to the prohibition law in America, it would have been possible to secure fairly reliable figures separating the total drink traffic into these two elements. As consumption is no longer a matter of official statistics, but of private bargainings with bootleggers, the quantitative data is somewhat beclouded. If rumors are to be trusted, there is still no little man-power devoted to the manufacture and distribution of high proof

spirits. In 1917 the consumption of alcoholic beverages in the United States was as follows:

Wines	42,723,376	gallons
Malt liquors	1,885,071,304	"
Distilled spirits	167,740,325	"
Grand total	2,095,535,005	" [16]

On the assumption of only 50,000,000 gallons of distilled spirits now consumed at $4 a gallon—allowing thus a huge margin for profit—the bootlegging industry would require the services of 100,000 workers.

Tobacco, in our opinion, has, like wine and beer, taken its place as a legitimate want. Even in casting minimum budget for workers' families a place is usually reserved for it. It is to be doubted, however, whether the present consumption of tobacco represents a real human want in total, but has not been unduly inflated by the appeals of advertisers, and by the current fashion of using the cigarette—particularly among women—as an article of dress.

Commercialized Vice and Crime

A careful survey by the United States Department of Justice in the years 1911 to 1913 revealed nearly 100,000 women in brothels in the country. Woolston estimates the total number of women in the regular army of vice, in and out of brothels, at 200,000.[17] Other writers have estimated as high as 500,000. Stanley W. Finch, at one time chief of the Bureau of Investigation for the Department of Justice, estimated a total of 250,000 girls and women, supporting 50,000 procurers.

The American Social Hygiene Association in 1919 placed the annual cost of maintaining prostitution at $628,000,000, as follows:

Paid to prostitutes	$164,000,000
Care of insane due to venereal diseases	51,000,000
Annual economic loss by virtue of insane	97,000,000
Cost of blindness	3,000,000
Detention of prostitutes	3,000,000
Economic loss by venereal infection in general population	310,000,000
Total	$628,000,000 [18]

This is obviously little better than a wild guess, but it is useful in showing us the by-product costs of vice—venereal infections, insanity, blindness. Syphilis and gonorrhœa kill 300,000 persons a year. For the 12 months ended June 30, 1921, 140,748 patients suffering from venereal diseases were treated at public clinics in the United States.[19]

To prostitution proper, we must add the white slave traffic, and the very considerable industry whose products are pornographic pictures and books, and the induction of the young into practices of sexual perversion. Hardly a boy grows to manhood without touching this lucrative industry at some point. There is no more diabolical form of illth than in preying on the powerful and unstable sexual instinct, for profit. Sexual problems are difficult enough to manage in the raw. To complicate and accentuate them deliberately and cold-bloodedly, makes us, for once, almost break into that temper of moral indignation which in this book we have foresworn.

A functional society would not abolish sexual irregularities, and could not if it would. Perhaps it could not even abolish formal prostitution. But it could take commercial gain out of vice, and with it would go back to useful labor an unknown but demonstrably large amount of man and woman-power.

Crime

Crime, like commercialized vice, represents illth at its worst. The man-power of the traffic has been estimated by L. F. Bower as follows:

Prison population	120,000
Criminals at large	200,000
Policeman, watchmen, wardens	200,000
Private guards and watchmen	100,000
Labor engaged in safe making, prison maintenance, auditing, and anti-crime devices	100,000
Total	720,000 [19]

It takes rather more man-power to watch the criminals than there are criminals themselves. The total makes quite a dent in the ranks of the gainfully employed. How much of this waste? Not all, by any means, for while a criminal nature cannot be inherited according to the latest findings in biology, people for generations to come will be born with queer mental kinks which make them liable to kleptomania and running amuck generally. Such people will need guardians—let us hope they will be psychiatrists—and institutions. And no generation will see the end of crimes of passion. The bulk of the present criminal class, so-called, both in and out of jail, are engaged, however, in raids on property—burglaries, arsons, thefts, hold-ups, frauds, swindles. How much of this would automatically disappear if high living standards were universally guaranteed? Not all to be sure, but would not the majority of this man-power—particularly if it had been raised in a secure economic environment rather than in a slum—go back to the ranks of honest producers? Not these particular individuals—their habit patterns are set—but their doubles in a functional society?

And for every criminal redeemed, back to the ranks of producers, would go a guard—and some fraction—as well. Would we be far wrong in estimating better than half the total man-power of crime as waste?

ADULTERATION

Robert Hunter, writing in the *Atlantic Monthly,* regards this particular form of illth as the most wasteful of them all. "In the absence of accurate data, one would be very indiscreet to speak of this or that waste as the greatest of all. . . . But a strong case might be made, it seems to me, for the waste of labor through its employment upon materials that have the shortest possible life; upon cloth that goes the soonest into tatters, upon leather that tears and cracks, upon timber that is not well seasoned, upon roads that fall into immediate decay, upon motors that must be junked in a few years, upon houses that are jerry built, upon nearly every article manufactured in quantity for the American public. . . . It is not the high price of labor but the poor quality of material, which makes the cost of modern production so great a burden upon the consumer." [20]

Under the present industrial order, quick turnover means quick profit. Maximum profit is, therefore, achieved by a flow of goods with the shortest practicable life. This axiom is always subject to the margin of quality below which repeat orders and resales are put in jeopardy. In other words there is a law of diminishing returns in adulteration which, if one is to remain in business, it is not healthy to transgress. But "from the interest of the glazier in hailstones to the interest of the wayside garage in accidents to motor cars and of the huge railway car shops in the most wasteful methods of transport, there are more examples to hand than we have room to describe

of the fact that under capitalism it is impossible to create an interest in production that is not also an interest in decay and destruction." [12]

There is the economic interest of the doctor in more sickness, of the dentist in bad teeth, of the architect and builder in wholesale fires, of the accountant in bad book-keeping ,of the cotton maufacturer in short fibres. Fortunately many, particularly in the professions, stand up against the tempter, but it is an endless struggle, for the tempter never sleeps.

Mr. J. A. Hobson points out that it is more difficult to defend necessities from adulteration than luxuries. The consumer tends to take his necessities for granted, but his golf clubs and briar pipe are subject to careful scrutiny. Producers realize this when a new product is launched—such as a cigarette or a breakfast food. They do not begin to adulterate until its use has become an unconscious habit. And Hobson, following Ruskin, is particularly bitter in the field of the adulteration of the arts: "The production of base forms of art in painting, music, the drama, literature, the plastic arts, must necessarily entail the highest human costs, the largest loss of human welfare, individual and social. For such an artist poisons not only his own soul but the social soul, adulterating the food designed to nourish the highest faculties of man." [11]

Dr. L. B. Allen of Westfield, Mass., as a result of his pure food investigation, has concluded that from 8 to 15 per cent of all food sold is debased. Mr. Alfred McCann has estimated that 3,000,000 people are made ill every year in the United States by adulterated food.[21] When Dr. Harvey W. Wiley started his pure food campaign, he found entrenched against him, according to Mr. McCann, the following embattled forces:

The borax industry.
The blended whisky industry.
The dried fruit industry.
The drugged pickle industry.
The polished rice industry.
The white flour industry.
The molasses industry.
The preserving industry.
The mincemeat industry.
The saccharin industry.
The sulphite industry.
The food dye industry.
The alum industry.
The glucose industry.
The leather industry which uses glucose as a filler.
The importers of opium, morphine and cocaine.
The patent medicine industry.
The benzoate of soda industry.

Meanwhile we learned so recently as February, 1923, of the shipment of 380,000 gallons of cotton seed oil from Hoboken to Italy, to be duly decanted, retinned, and re-shipped to America as "pure olive oil."[22]

Then there is the more sinister type of adulteration which packed the life preservers of the "General Slocum" with sawdust instead of cork, as she sank with all on board. Over 2,000 persons have been killed in theatre collapses in the past ten years, many of them due to jerry building.[23]

The Federated American Engineering Societies report the extensive "doping" of leather to cover up imperfections in the manufacture of shoes, and the high factor of non-durability in women's shoes.[24] The veneering of woods to pass them off as "solid mahogany" or "fumed oak" is one of the fine arts of the furniture industry. A furniture salesman in a large New York department store recently

avowed that he was no longer sure whether "solid mahogany" meant solid all over, or just the top and prominent surfaces of the article.

Yet when, as in the case of the tire industry, quality and wearing power have been increased (in 1924) to an average life per tire of 1 year and 8 months as against 1 year and 4 months in 1920, the Cleveland Trust Company in its official bulletin of September 15, 1924, remarks:

"These figures explain some of the troubles that have beset the tire industry, which *has been penalized* for the marked success in improving its product."

How penalized? By slower turnover, and loss of sales. Could the drive behind adulteration be more effectively illustrated?

Mr. F. L. Ackerman, an architect who has given wide study to housing wastes in New York City, finds that the urge for quick turnover has extended even to building operations, and that city apartments are now being erected as *short term* investments, to be torn down and rebuilt as land values shift under them. On the average all the plumbing in New York City has to be replaced every eight years. It takes twice as many plumbers to replace as to install originally, and Mr. Ackerman concludes: "Altogether we now require three times as many plumbers to install and reinstall as would be the case if buildings were made durable in the first place." He estimates that house owners the country over spend half a billion dollars a year in the repair of rusted metal work—the greater part of which is avoidable through the use of more durable materials in the first place.

Ernest Flagg, another well-known New York architect, in an article entitled the "High Cost of Deceit," comments on current building operations: [25] "Many of our high buildings are monumental deceptions. Few things

about them are what they pretend to be. They have walls which are not walls, columns which are not columns—at least they support nothing and are themselves supported. What appears to be massive masonry is often only a thin veneer intended to camouflage the steel frame. They have stone made of terra cotta, sheet metal, cement or anything except what it simulates. The ordinary small house is almost as bad a liar as the tall building. It may have a roof which pretends to be shingles with vertical joints so as to appear like what it isn't. . . . Inside the house expensive shams and concealments abound and the result is thought to be 'artistic.' Door frames are not real but shams, the real frame being covered with casing or trim which requires six times as much inflamable material, and six times as much time and labor to make and set as would be necessary if the true frame were made presentable and shown. The same is true of bases. Casing abounds throughout with the object of covering up and concealing the structural members which, *at a fraction of the cost* might be made ornamental and furnish to the interior the best of all forms of decoration. Wherever and whenever architecture has reached a high state of perfection, the structural parts decorate, for good architecture is honest." Mr. Flagg's strictures are supported by a recent (May, 1925) report of the American Construction Council following a year's investigation in the field. The Council finds that building methods in the average city are "deplorable," and that many small houses, newly built, "will be worthless within ten years."

Mr. Ackerman's plumbers give us some idea of the labor power lost through the factor of adulteration. Doubling durability tends to cut labor cost in half. While some additional man-power may be involved in the original fabrication of more enduring materials, it could not equal the

loss of man-power by reason of quick turnover. And to this, in the case of adulterated foodstuffs, we must add the cost of additional medical care. Finally, this category must be mainly qualitative. The measurement of the man-power lost by reason of adulteration, escapes calculation—but it must be very great. A half billion dollars in needlessly rusted metal work alone, accounts for 250,000 laborers.

Quackery

Closely allied to adulteration, is the field of the quack, the charlatan, and the get-rich-quick performer. Capitalizing the same gullibility which we saw operating in the case of patent medicines, plus the national craving to get rich without work inherent in an acquisitive organization of society; lifted to power on the wings of advertising, the vendors of bunkum and hokum make an excellent living off the body politic, and divert no little man-power to their precious ends.

There are 2,500 persons posing illegally as doctors of medicine in New York State alone. They are duly equipped with false diplomas obtained through the "diploma mill ring." The Oriental University in Washington, D. C., sold such diplomas to whomever would buy for $200 per parchment.[26] And the Oriental is only one of several such universities. Add to the bogus medical men, the swarms of "healers"—mental, moral, electric, glandular, spine pounding, toe dancing, vibrating, thought waving, and the total, while untabulated, must reach respectable proportions. The New York World reports that one, Joseph S. King, recently convicted of unlawfully practicing medicine, used a card on which were printed the letters "B. T. H. M. B. S. D. C." Asked what all this meant he told the judges, "Baptist, Truth, Heaven, Master of Biblical Science and

Doctor of Chiropractic." We do not seek to classify as illth the services of all healers who depart from the canons of orthodox medicine. God forbid. In Christian Science, New Thought, Theosophy, Chiropractic even, there are thousands of earnest and sincere men and women, who have doubtless eased pain and brightened the lives of many a patient. Mental healing is hovering on the brink of a recognized therapy. But over and above this sincere but unorthodox vanguard, there flies a swarm of charlatans, devoid of all sincerity, whose steadfast motto is to collect all the traffic will bear.

In the medical field, Dr. Paul H. De Kreif has analyzed a few typical frauds.[27] In his "Vaccines for Broken Legs" he outlines the great and profitable traffic carried on by the gentry who have capitalized scientific discovery in the field of vaccines and serums. With the discovery of salvarsan for the treatment of syphilis, the quacks promptly entered the lists with Spriocide—a dangerous method of mercury inhaling, Swifts Sure Specific, Sodium Cacodylate, and Venarsen—the latter three useless. The discovery—but as yet, the non-isolation—of vitamins has brought forth a great traffic in spurious compounds and unsubstantiated claims, which Dr. De Kreif has well termed the "Vitamin craze." New scientific data in regard to glands, and particularly, possible rejuvenation through the transfer of glandular substances, has revived many an old "shotgun" remedy—good for every ail which man is heir to, and now good for glands.

It would seem that about every advance in physics and chemistry—particularly if it be in any way applicable to the curing of disease—there hangs a well-organized group of medicine men ready at a moment's notice to capitalize, with useless and often dangerous drugs and devices, the wide publicity which the new discovery has secured. Vac-

cines, radiations, glands, salvarsan, vitamins and even the electron.

J. B. S. Haldane, the English biologist, quotes instances: "The faker is already on the market with radiations to cure rheumatism and make your hair grow. These are mostly harmless but probably the sale of X-ray tubes, *which may cause cancer,* will some day be as carefully regulated as that of strychnine. . . . There is no serious reason to believe that any of the rather expensive products of the sex glands now on the market, and often prescribed by doctors, are of any value except as faith cures." Haldane outlines the progress of the biologist and chemist in respect to diet, and how patient men in laboratories are in sight of providing us with the principles of a perfect diet, yet, "for every dollar which we (the scientists) can spend on research and publicity put together, the food-faking firms have a thousand for advertising 'scientific' foods." [28]

Consider the role of the quack in stock selling. The American Institute of Accounts after careful investigation concludes, that since the war, upwards of $3,000,000,000 have been stolen from the American public through the sale of spurious securities. Mr. H. G. Donnelly, Jr., writing in the *Annals,* places the yearly total at between $600,000,000 and $1,000,000,000—a reasonably close check.[29] Mr. Donnelly lists a few of the more notorious frauds.

The oil stock swindles of Dr. Frederick A. Cook.

The Pan Motor, and the Angola Tire schemes which took millions from unwary investors.

The Commonwealth Hotel Construction Company.

The James Elliott Business Builders.

The Cleveland Discount Company.

The Union Home Builders. A gigantic lottery, whereby the holders of numbered contracts receive a loan for home building by lot. An individual might pay premiums for forty years before his number was reached.

The Muscle Shoals land development swindle.

Perpetual Motion machines, compressed air automobiles, blind pool speculations, moving picture promotions, fake batteries and battery solutions, questionable correspondence schools. The "petticoat-for-a-dime" endless chain. The famous "shut in" game, whereby "outfits" are sold to invalids—"earn $25 to $50 a week with pleasant work at home." And the charming game of the Canadian gentlemen who offered to deliver, for $18.00, a case of "Canadian Rye, the beverage of our grandfathers." The gullible and thirsty got twelve full quarts of rye grain!

Then there are the mediums, the seers, the Oriental mystics, the swamis in bath robes, the new "psychologists," the magnetic personality experts, the how to write, and how to paint, and how to learn the violin at home, performers. There is Oom the Omnipotent, The Yogi from Kansas with his resplendent progress through the drawing rooms, and the yellow journals of New York. An endless list, flourishing with great vigor and profit among the retired moujiks of California and Florida. Meanwhile Mr. John B. Watson, the behaviorist, has analyzed for us the psychological faker—particularly in the fields of "character readings" of prospective employees, character reading from photographs, phrenology, and handwriting diagnoses. All unmitigated bunkum.

Mr. Alvin F. Harlow, who was for many years an illustrator and engraver skilled in aiding and abetting quackery, has made full confession of his technique in the *American Mercury* for March, 1924. "Three of mankind's greatest cravings are for money, for some sort of worship and for relief from pain; and on these three, therefore, the majority of swindlers build their fortunes. Some of the greatest fakery ever practiced with the aid of the artist and photo-engraver has been perpetrated by quack doctors and cure-all compounders." Mr. Harlow proceeds to par-

ticulars with a detailed description of the processes involved in before-and-after-taking pictures, and in facsimiles of testimonial letters. "It is a thousand to one that the before-and-after appearance has been produced by the combined skill of the artist and engraver. . . . I myself have aided in the making of hundreds of fake ones. A touch of shadow under each cheek bone, a bit of darkening around the eyes to make them appear hollow, a little drawing down of the corners of the mouth, a slight dishevelling of the hair, and there you have a sick man. I have even painted tumors, boils, pimples, scrofula, eczema and dozens of other afflictions on pictures of tolerably sound-looking faces and bodies. Then, after the cut is made, the retouching is washed off the photograph, wrinkles are painted out, sparkle is put into the eyes, the corners of the mouth perhaps twitched up in just the suggestion of a smile, and here is your sound, healthy, contented man who has been made over and inducted into a new life by six bottles of Liquozone or Kickapoo Indian Sagwa."

Mr. Harlow tells of how to take photographs for the glory of the physical-culture-by-correspondence industry. *Before* subscribing to Dr. Strongblood's twenty little lessons: Focus the camera and let the model hang his arms loosely at his sides, slump his shoulders forward, assume a woe-begone expression. From the print, the artist thins the face, paints in the position of each rib until the final cut makes the subject look like a famine sufferer, without ambition and without hope. *After* subscribing: Take another picture (within five minutes of the first) of the same model, still stripped to the waist, but with arms folded tightly across the chest so as to bulge the biceps, shoulders thrown back in peacock strut, a proud self-satisfied expression. On print number two, the artist again applies his craftmanship but this time with

convex rather than concave aspirations. The finished job represents a young Hercules, sufficient to capsize any anæmic bank clerk when the two "photographs" appear side by side at the head of Dr. Strongblood's succulent advertising.

For a series of distinguished cancer specialists including the famous Doctors Pyke and Pyke, Mr. Harlow lavished his art on painting ulcers and cancers upon cabinet photographs of healthy people, the same being used to drum up trade—the faked one "before"; the original "after." For Dr. Q—originator of Brazilian Balm—Roots and Herbs Procured at Enormous Expense and Hazard from the Uttermost Depths of the Great Tropical Forests whence flow the Mighty Tributaries of the Amazon—for Dr. Q, no less, Mr. Harlow engraved a grippe germ. "What am I to work from, Doctor?" he asked. "It doesn't matter," replied the worthy, "just draw an egg-shaped thing with one eye on the smaller end and a lot of long, wriggley legs. Be sure and make it horrible looking." The horror was duly produced and appeared in Dr. Q's advertising for years afterwards under the caption: "Grippe Germ from a Photograph Magnified 1,600 Diameters."

But perhaps, Mr. Harlow's loftiest achievement was the making of a half-tone plate of Jesus to be used as the bona fide photograph of Francis Schlatter, the Divine Healer of the West. "Yes, we commercial artists help all the healers and cults to prove their doctrines! I am not sure that religious charlatans have not taken as much money from gullible humankind as either stock swindlers or quack doctors—perhaps more."

We can take no toll of the quacks in enumerated man-power, but does a day go by without our encountering the Royal Nonesuch in one or another of its endless transformations?

CHAPTER VI

MORE ILLTH

Speculation and Gambling

As we have already intimated, gambling seems to be an inherent part of human nature. Bets, wagers, games of chance are found in every age and every race. Functional society or no functional society, gambling will go on. Waste seems to appear in this category when gambling is artificially stimulated by organized business methods, *i.e.* bookmaking, or the Monte Carlo technique; or when gambling in the necessities of life—such as land or wheat—leads to social confusion and loss. We have no concern with the monetary turnover, and we shed no tears for the shorn lambs. We only note that much gambling and speculation falls under the head of illth, and a very considerable array of man-power in "joints," in bucket shops, in grain pits, and in real estate offices, is catering to this output.

Commercial speculation

Veblen states the major count: "The chief attention of business men has shifted from the old-fashioned surveillance and regulation of a given industrial process, to an alert redistribution of investment from less to more gainful ventures . . . this activity involves an actual increase of the risk and uncertainties of productive processes. . . . Broadly speaking this class of business men, in so far as they have no ulterior strategic ends to serve, have an in-

terest in making the disturbances of the system large and frequent, since it is in the conjunctures of change that their gain emerges." [1]

And so stock markets, produce exchanges, the dealing in options, futures, short selling, rigging the market, bolstering, hammering, unloading, switching, specified margins, "profit taking." Many a manufacturing establishment devotes more brains to speculating in raw material, than it does to running the plant. The natural human impulse that expresses itself in a poker game, a bridge party, or a running race, is enormously stimulated by the quite gigantic gains to be made—losses are dead memories—in the operation of an economic system based primarily on price considerations. Mr. Arthur Clutten of Chicago has just "cleaned up" $1,860,000 by buying 1924 wheat at 76 cents and selling it at $1.08.[2] Billions have been made by lucky guessing in land development. The cult of something for nothing comes to most perfect flower in gambling, not with cards, but with land on which people must live, with wheat which they must eat, with oil which they must have, or with raw materials with which they must cover their backs.

Economists have claimed that, granting a price system, speculation has a useful effect in steadying prices. Doubtless this is often true but it is a case of burning down the house to get roast pig. Machinery for steadying prices—particularly if it were based on some idea of national requirements—could be carried on with a fraction of the man-power which now waits in, about, and upon the stock exchanges and the produce exchanges of the country.

Speculation in land, from the public point of view, is usually an unmitigated evil. In rural lands, it is the chief contributing cause to the growth of farm tenantry and the present economic plight of the farmer. In the boom

of 1919, nearly 20 per cent of all farms in Iowa changed hands while the price per acre went from an average of $257 in January, to $442 in December.[3] The lucky ones went to Los Angeles, while the final owners went into insolvency, or raised heaven and earth to pass the increment on to the consumer of bread. In urban lands, the New York Commission on Reconstruction (1920) concludes: "To a great extent the problem of housing is a land problem. The influx of a population into a new area immediately augments the value of land. The newcomers pay the increase in rent or cost of the house. Any improvement in houses has the same result. Neighboring land goes up in cost. Further improvements are stopped by increased costs. Only the wealthy can afford to live at such a distance from our urban centers that land is cheap. The poor man is forced into smaller and smaller quarters. . . . The increased values of land which result solely from the fact that individuals are crowded together are of no benefit to those who create them. This land increment is wasted in most cases in land speculation. If the city pays for a subway to distribute the population over a wider area, the land along the subway immediately increases in value. This increment, the result of the action of the community, generally goes to land speculators. It is charged as a part of the cost of the house, either as rent or selling price. This increased value that comes from the causes above mentioned is sufficient to deprive a large part of the workers of this state of the chance to get decent homes."

The services of the land speculator are thus definitely anti-social. His time and energy are given to guessing which way the community is going to grow, and capitalizing land values before the community gets there. If he has an inside tip on a new subway, boulevard, parkway; his chance of profit, and the community's chance of loss, is

immensely augmented. If a functional society could abolish his services, and the services of speculators in other necessities of life, not only would the army of the usefully employed be augmented, but a rigid and unyielding barrier would be removed, against which community planning has repeatedly struck its head in vain. Measured with this waste, the output of the bookmaker, the gambling hell, the baseball pool, is small indeed.

Yet on December 2, 1920, the New York Sun reported that $50,000,000 had been bet on the machines at four large Maryland race tracks during the 110-day season then ended. This sum does not include, of course, the amounts wagered on the same races at places distant from the tracks through betting commissioners and bookmakers. During the season of 1924, over one billion francs were wagered on Paris race tracks.[4] On August 16, 1921, the *Chicago Tribune* charged that $500,000 a year was the tribute exacted by the Chicago police for giving immunity to gamblers in the Black Belt.

Super-luxuries

This is a delicate category to handle. If one has a moderate income—or less—the temptation is great to pass severe moral judgment on the extravagance of the rich. If one is well up on the income tax schedules the temptation is equally great to defend one's expenditures as the backbone of the arts, the sciences, and the spread of culture gnerally. Where would be the theatre, the opera, poetry, painting; how could art flourish at all save by virtue of the long purse strings of its patrons? Neither point of view meets the problem squarely—the one is tinged with envy, the other with sophistry. All luxury is not wanton waste, and neither is all luxury the nursing ground of the fine arts. The patron plays a rôle today—chiefly because

the community is not organized to take responsibility. The most glorious art the world has ever seen flourished at the behest of the free citizens of Athens.

Furthermore, our theory would hardly admit of any man-power going into works of genuine beauty, particularly if the public had opportunity to view them, as an element of waste. We are not concerned with who pays for it but with the thing itself. If it is a beautiful thing it is not waste. Our interest lies in the proliferations and super-elaborations of living—brigades of servants, ornate and empty mansions, the swank and glitter of a plutocracy which knows no more of art than a magazine cover draftsman. Even here, however, there may be a certain experimentation with the uses and abuses of expensive living, which is not altogether valueless. There have been few civilizations without a gaudy head-dress in the form of a leisure class. The waste of super-luxuries, so far as it can be defined at all, would seem to lie in the man-power devoted to goods and services, above the line of comforts, outside the field of art, with still a substantial margin tolerated for some experimentation with a leisured and elaborate life. But it is doubtful if a functional society would tolerate a very wide margin of experimentation, until necessities and comforts had been provided for. This definition, furthermore, applies not only to the spendings of the rich, but to the cheap imitation thereof on the part of the economic groups lying under.

The Secretary of the Treasury, basing his figures on income tax returns, estimated the expenditures for luxuries in the year 1919 as follows:

Jewelry	$ 500,000,000
Musical instruments	250,000,000
Toilet soaps, etc.	400,000,000
Automobiles and parts	2,000,000,000

Perfumery and cosmetics	750,000,000
Servants and luxurious services	3,000,000,000
Luxuries in hotels and restaurants	750,000,000
Luxurious food	5,000,000,000
Candy	1,000,000,000
Soft drinks and ice cream	600,000,000
Cakes and confections	350,000,000
Cereal beverages	230,000,000
Chewing gum	50,000,000
Cigarettes	800,000,000
Cigars	510,000,000
Tobacco and snuff	800,000,000
Cigar and cigarette holders	1,000,000
Furs	300,000,000
Luxurious clothing, carpets, rugs	1,500,000,000
Liveries	3,000,000
Hunting garments	7,000,000
Firearms and shells	50,000,000
Sporting goods	25,000,000
Yachts	1,000,000
Art works	15,000,000
Electric fans	8,000,000
Admissions and dues	800,000,000
Resorts, races, joy rides, etc.	3,000,000,000
Total	$22,700,000,000

In the year 1919 the national income was about $66,000,000,000, and thus the above total constitutes a third of the entire purchasing power of the American people.

The first comment to be made on the Treasury figures is that the Secretary has taken some unusual liberties with the common definition of luxury; the second, that he had evidently done some high and lofty guessing in certain categories—resorts, races, and joy rides for instance. But granting these deficiencies, the figures still stand as the only official estimate ever prepared of the nation's outlays for goods and services above the line of necessities.

Probably less than half the $22,000,000,000 would come under the head of genuine illth in the form of super-luxuries. The majority of the items include a large share of what

can only be classed as reasonable comforts, well within the area of normal and legitimate wants. What part of the $5,000,000,000 for luxurious foods is conspicuous waste and what part just ordinary delicacies which we all like? What part of the $300,000,000 for furs is pure swank, and what part is a good warm coat against a northern winter? These questions evade statistical answer. A jury passing on article after article could obviously make a pile of sound comforts and a pile of wanton extravagance, but the largest pile of all would be in the intermediary zone for which no unanimity of opinion could be found.

The "make work" theory is probably applied to luxuries more than to any other single field. Paul H. Douglas holds that this fallacy is based on two assumptions: first, that money spent on luxuries would not be spent on anything else, and second, that workmen employed in producing luxuries could not produce anything else. The curtailment of luxurious expenditures would not necessarily mean throwing men out of work, but merely transferring them from less to more socially desirable occupations. He points out that the building up of war industries in a short time was a good example of the possibility of making gigantic transfers of productive energy with relatively little unemployment and friction.[5]

Super-luxuries commonly connote wanton outlays on the part of the very rich. Veblen takes exception to this view. In the *Theory of the Leisure Class* he maintains that while the top group—the nobility, the aristocracy, or, in democratic countries, the plutocracy—sets the standard of conspicuous consumption and waste, the classes immediately below imitate this extravagance to the limit of their purses, in a very human desire to demonstrate to the world that they are as good as the next man. Each economic class tends to imitate the luxuries of the class immediately above. Rare perfumes for the idle rich become cheap perfumes for

the shop girl. Bell trousers on the Prince of Wales become bell trousers on bond salesmen, and a little later, on bookkeepers. Whether or not Veblen's intriguing theory has universal application, it certainly illustrates a tendency—particularly in democratic countries where the ruling class is not viewed as ordained by God. One suspects—though it is incapable of statistical proof—that for every dollar spent by the very rich in the Treasury figures above quoted, two or more dollars is spent by the middle class and the poor in buying cheap imitations in the same category. What proportion of the total jewelry bill of $500,000,000, for instance, represents purchases by the wealthy, and what the wedding rings, engagement rings, lodge rings, bosom adornments, bracelets and necklaces of the respectable suburbanite family, the stenographer, the clerk and the boilermaker's wife?

> "Most rich people value riches less for the pleasures they afford than for the social consideration, the personal distinction, they procure." [6]

Against such distinction, the submerged economic classes make their utmost protest.

Have we any means of determining what proportion of the $22,000,000,000 can be identified as genuine super-luxuries? Based on the returns of the Bureau of Internal Revenue for the year ended June 30, 1921, Mr. Roger Babson estimated the total expenditures for luxury at $13,766,000,000—a large decline from the 1919 estimate. If we cut the Treasury figures to a third, and Babson's in half, we get some $7,000,000,000—roughly a tenth of the national income. Meanwhile Professor Bowley, the British statistician, after a careful study of the national income in England for the year 1913, concluded that some 10 per cent thereof was "squandered by supermen and superwomen in motor cars, yachts, fine houses, expensive clothes and

jewels, fashionable restaurants and the like."[7] (And Bowley is careful to point out, that if this 10 per cent of productive power were transferred *in toto* to the making of necessities, it would not greatly raise the standard of living for the masses of the population.)

On the basis of 10 per cent of the national income being spent by the rich—and not all of it is squandered by any means—and another 10 per cent (though it is probably more) spent in imitating the super-luxuries of the rich (and much of this would have use value), would we be far astray in estimating at least 15 per cent of the national income, or roughly 15 per cent of the productive man-power, going into super-luxuries—including recreations and fashions? This is the best guess we can make. Fifteen per cent of the total man-power of the nation is about 6,000,000 of workers.

Sidney and Beatrice Webb have calculated that a rich woman will consume on her garments the whole year's labor of from 100 to 200 garment workers. They cite the case of one matron with 79 nightgowns, and an average of five changes of clothes a day. A gentleman's town or country house is empty for a large fraction of the year, depending on the town or country season, and it frequently requires from 5 to 25 servants to keep it in order for 3 or 4 occupiers. "The normal consumption of food values in the Idle Quarters, measured in labor required for production, is about 20 times as costly as that consumed by the ordinary workers."[8]

Mrs. Edward Henry Smith Wilkinson of Nottingham, England, is glad to lay claim to $3,400,000 worth of jewels, $128,000 worth of gowns, $64,000 worth of hats, and a $60,000 sable wrap.[9]

Mrs. Christine Frederick points out that in 1923-24, fifty new foreign perfume makers opened offices in America,

and that the money women have saved through the abolition of the petticoat is now going into cosmetics.[10] In the toilet goods section of a New York department store, one finds today 10,000 distinct varieties to choose from.[11] The total cosmetic bill of the nation for 1923 is set by the Census Bureau at $117,000,000.[12] Meanwhile the retail druggists in convention at Washington (December, 1924) report that men spend $750,000,000 a year in "tonsorial parlors"; that 17,853,000 boxes of rouge were brought by women in 1924, together with 240,902,000 boxes of other beautifiers—cold creams, powders, and so forth. A "personality perfume" is now on the market. The prospective buyer—or sucker—fills out a lengthy questionnaire covering her physical attributes. On the basis of this questionnaire, the seller compounds a perfume "fitted to the personality." In said fitting, six basic cheap perfumes are used, costing about 20 cents. The sucker pays two dollars.

Mr. Frank Ward O'Malley collected the following data in a shopping trip along Fifth Avenue, New York, in the spring of 1921:[13]

Women's Shoes	
Plain evening slippers.............. $	20 a pair
Cheapest shoes (in several shops)....	25 a pair
Ordinary street shoes (in one ultra smart shop)....................	65 a pair
Women's Hats	
Plain straw sport hat................	25
Simple but smart walking hat.........	40
Small dress hat.....................	100 to 175
Women's Gowns	
Popular one-piece street gown........	250 to 350
Bath negligee.......................	250
Tea gown..........................	300
Tailored suit.......................	350
Smart evening gown (popular price)..	700 to 1,200
Ultra smart evening gown...........	5,000

Women's Coats	
Tailored sport coat..................	75 to 100
Ordinary Russian sable	12,000 to 40,000
Good Chinchilla for evening wear....	40,000
Matched Russian Sable.............	62,000 to 120,000
Miscellaneous Doodads	
Feathered fan	25 to 50
Bandalette	35 to 40
Smart night gown...................	50
Silk sweater........................	50 and up
Stockings—evening wear.............	10 to 25 a pair
Lace stockings (in one smart shop)..	500 a pair
Women's Jewelry	
Lip stick............................	25 to 100
Vanity case.........................	36 to 200
Hatpin	100 to 150
Cigarette holder....................	125 to 350
Cigarette case......................	175 to 350
Small check book—mounted.........	150
Gold mesh bag.....................	425 to 2,200
Toilet set (18 pieces)................	650 to 750
Lorgnette	500 to 1,000
Bar pin.............................	1,000 and up
Popular flexible bracelet............	1,000 to 2,000
Pearl necklace......................	6,000 to 8,000
Strings of pearl......................	150,000 and up

Fashions

In the window of a smart jewelry shop on the ground floor of the building in which we write, there hangs this legend:

"Have your wedding ring made up to date."

The larger aspects of waste due to fashions have already been treated in the foregoing section on luxuries. Here we shall content ourselves with a few special observations. The *Harvard Business Review* for July, 1924, carries a study by Dr. Paul T. Cherrington on styles and fashions as they affect the textile industry. Women's fashions,

he finds, depends largely upon reports from Paris designers. These reports "are subject to sudden and incalculable change. Many fabrics and garments, intrinsically as good as on the day when they were made, suddenly become obsolete and unsaleable." While in the hands of the ultimate consumer, they become obsolete and unuseable—(alas, the business of the "make-over" seamstress is not what it was)—these incalculable reports introduce a highly speculative and hazardous feature into the whole textile industry, affecting both materials and garment making. The process of producing and distributing textiles takes time. From four to six months are necessary for the economical production and delivery of mill products. As a result, a mill aiming to produce style goods in quantity often spends the first half of the period trying to guess the trend of the market and hoping for definite orders, and the last half in feverish overtime work. Three months of waiting and three months of rushing, neither of which conditions are good for efficient operation. The same situation holds true, perhaps even more acutely, in garment making. The fear of style change causes retailers to hold up orders until the last minute, thus ruining balanced production in the garment trades, which throws economical scheduling out of gear in the textile mills. The inevitable result is a terrific seasonal load in all industries depending on style changes, and consequent unemployment, broken schedules, and waste.

So serious have style changes become in the manufacture of women's shoes that in some years two pairs are made for women, for every one pair made for men. Shoe manufacturers try to create demand and sales by augmenting style changes. Meanwhile there are slightly more men than women in America, and by and large they use their feet an equivalent amount of time! [14]

Mr. Frank F. Wieder of Kirchbaum and Company makes this proud observation showing that style changes are not engineered in women's clothing exclusively:

"Just recall the recent happening (Sept., 1924)—that noted sportsman, the Prince of Wales, makes popular a certain type of suit, and practically, in three months, this garment is within the reach of the entire clothes-buying public of this country."

In the *Daily News Record*—an organ of the clothing industry—there recently appeared an official report, illumined by statistics and charts, of an investigator who had studied men's styles at Palm Beach.[15] We quote from the document as addressed to the retail haberdasher: "The one big thing worth your deepest consideration is the fact—18 per cent of the men on the golf links are wearing flannel trousers instead of knickers. When your time comes to sell flannel trousers in quantity play them hard! A man at a summer resort with just plain white flannel trousers is a hick. People will think he has just one pair that he washes and presses in his room at night. It's like a man who wears nothing but plain blue collar-attached shirts. Very few men *can afford* to let people think he doesn't change his shirt every day. Your customers should all have plain white flannel trousers, of course. But they should alternate with a pair of stripes—or several pair of various stripe effects. You should sell more flannel trousers than you sold knickers if you promote the fact—in your advertising—why a man should have a *set* of flannel trousers. Be frank and tell the men in your town why they should have whites and grays, plain and with stripes. . . . The public while they think they are sure what they want, they want to be told what they want. They will believe a chart showing in cold hard figures what the men they envy and imitate are wearing."

The National Association of Retail Clothiers and Haberdashers is starting—with appropriate advertising—a new Movement. Its slogan is "Dress Well and Succeed." President Schloss at the annual dinner (December, 1924) sounded the keynote. "You may have one head but why shouldn't you wear more than one hat?" He counseled his hearers to make a drive for selling their customers *three* straw hats, a sennet for business, a soft rough for sports, a split straw for evening wear. He bids us look at so lowly a figure as the English clerk. And what do we see? Frock coat, top hat, gaiters, a stick. In America, alas, silk hats are found only on bridegrooms and cab drivers. We must win men over to the social, cultural and financial importance of smart appearance. The aim of the Dress Well and Succeed campaign is to make men "more clothes-conscious, more clothes-fastidious, more clothes-desirous. (Accent on desirous.) A revival of dress-consciousness on the part of the public is a big and essential task." Mr. Schloss like Mr. Babbitt thus pledges himself and his Association to Service. In passing he gives some figures that are not without significance to the larger problem of waste. He says that in the United States only 62 suits per year are sold for every 100 men; 52 new hats, 18 pairs of gloves. "Such figures indicate how badly the men of America are undersold on personal appearance."[16] They also indicate the appalling shortage of some of the prime necessities of life. Meanwhile *Women's Wear* reports, in the spring of 1925, a drive by the hat manufacturers against the felt hat. It wears too long.

Fashions in dress are the outstanding illustrations of waste, but they are by no means the only field covered by style. Nearly every item in the comfort and luxury budget has a greater or lesser style factor. The furniture industry has recently announced a campaign to convert

the American people to an annual change in furniture styles. It is felt that the industry cannot fulfill its manifest destiny without providing us with a new drawing room set at least once a year. Shoe retailers in convention at Atlantic City, February, 1925, announce: "We hope to make the man who wears winter boots after May 15 as uncomfortable as he who wears a straw hat after September 15." [17]

Consider fashions in jewelry, pets—particularly dogs, the whole phenomenon of "collecting"—period china, antiques, paintings. There are fashions in literature, in architecture, flat silver, table laying, even foods. Note the smartness of that half grape fruit. There are fashions in hair cutting, manicuring, whisker wearing. There are fashions in office appurtenances—the flat topped desk, the protectograph.

In our judgment a slow swing in fashions represents a true human want. One wearies of sameness in clothes and furnishings. The "last word" frequently adds a desirable spice to life. The waste of illth does not arise with fashions as such, but only with stimulation which artificially shortens the period of the normal swing. We know such stimulation exists. We know it is responsible for a large amount of unnecessary man-power. How much escapes quantitative measurement. The performance of the women's shoe industry as a single example, makes it reasonably certain that with styles swinging for women no faster than for men, one pair of shoes out of every two would never be produced. Better materials and workmanship going into the remaining pair would, of course, act as an offset. Perhaps half the man-power of this industry is now lost through fashion changes—a loss transmitted into the leather and shoe finding industries as well. And what is true of shoes, applies to clothing,

textiles, automobiles, house furnishings, foods, personal adornment.

Commercialized Recreation

"To play football is one remove from battle, to watch the game is two removes, to watch the tape or the sporting sheet is three removes. Yet millions of little thrills of satisfaction are got from this simulation of a simulated fight." One should, we presume, be thankful for the thrills. A want, however far removed, is met. The question remains could not the thrill be measurably increased and the want more squarely met, if we did less watching, and more playing?

Recreation we have admitted unreservedly to our classification of wants. For ourselves, it has been known from time to time to take precedence over the necessities. Man is a playing animal so far as the record of anthropology runs. We believe a functional society would give him a better chance to play. Today, organized recreation is largely in the hands of business interests, and as there is more money to be made from watchers than from players, playing tends to become more and more of a commercial as against a sporting undertaking, and watching becomes a matter of astute publicity and quantity production. Major league ball teams sign players at salaries which run into five figures; a pugilist demands a million dollars for his end of the purse in a world's championship battle, while another pugilist refuses to fight for a paltry $250,000; golf professionals are making up to $30,000 a year; hockey players get several hundred dollars for a single game; ski jumpers receive $200 a week; basketball professionals get as high as $250 a game; and, almost the last barrier to fall, tennis stars are paid so much per exhibition.[18]

When Mr. Dempsey steps from his million, more or less, in the prize ring, to the movies—another great source of popular recreation—a further million more or less is forthcoming.[18] In 1921, the investment in the moving picture industry was half a billion dollars, producing costs were $200,000,000 a year, and the annual turnover (*i.e.*, the retail trade) was $1,440,000,000. Meanwhile 18,000 theatres ministered to a daily attendance of 20,000,000—a fifth of the population.[19] There are over forty actresses and actors with salaries ranging from $1,000 to $10,000 per week. And distribution costs—technically a very simple matter as compared to production—take 40 cents out of every motion picture dollar. With the movies deliberately written down to a twelve-year-old intelligence level, one wonders to what extent they provide genuine recreation, and so meet a true human want.

In England, Mr. F. E. Bussey spent 600,000 pounds in bringing a new sensation to Wembley's Fun City.[20] Our Coney Islands and our White Cities have reduced laughing to a pay formula. Coney Island, we confess, amuses us, but not so much as Sandy Hook where nothing obtains but dune and sea and sky, and the cost is precisely nothing.

Even the colleges have caught the big business flavor. "There is too much money, too much professionalism, too much devotion to acquiring championships and large gate receipts, at the expense of true sportsmanship."

That is it: at the expense of true sportsmanship. We enjoy sport of all kind. If we can't play, we like to watch. We hold no brief against prize fighting, against Hollywood, against college athletics. But in these enormous outlays of massed capital and quantity production, true sportsmanship is somehow lost. And recreation, in our judgment, tends to go over into the column of illth when the business man drives out the sportsman.

The Overhead Trades and Professions

The chart in Chapter II shows some 8,000,000 workers gainfully employed in overhead services. They are not producers, distributors, or transportation workers directly, but fall into a class which renders service to all these fields, as well as certain direct services to the consumer. Here are included professional people—doctors, lawyers, engineers, teachers—government employees, bankers and financial people, and, largest category of all, the personal services of barbers, hotel keepers, restaurant keepers, domestic servants. We have already written off some of this service as waste when considering super-luxuries, fashions and quackery. Oom the Omnipotent is probably listed in the Census as a semi-professional man. Butlers and flunkies have been glanced at. There remains for consideration a brief examination of the learned professions themselves, the financial force, and the government man-power—insofar as it is not part of the military establishment.

"A professional man," said Huxley, "is one who applies science and education to meeting the wants of man." Of the total number in the learned and lay professions how many are living up to this definition?

Take the law for instance. How many lawyers are aiding in the administration of a smoothly running procedure of justice, and how many are throwing their influence in the direction of confusion and complication? How many are hunting claims to burden a machinery already loaded down? On such, Veblen lays a heavy hand: "American law and procedure have taken shape under the hand of legislatures and courts which have habitually and as a matter of course been made up of investors and lawyers, with no control from outside these classes; and the upshot of it has been an arrangement such as to serve the convenience and profit of these two classes of persons, such as

to increase the cost, volume, uncertainty and intricacy of litigation." [11]

The famous case of Jarndyce vs. Jarndyce is not the only one which has strung along interminably. In the chemical industry there is a very wide latitude for litigation due to lack of standardization in manufacture. Courts are forced to pass on scientific and technical questions of which the learned judge, as well as the lay jury, have little knowledge —with much confusion and delay. Henry Ford remarks that "most railroads have enough lawyers working for them to run them." Competent lawyers in the profession itself, have repeatedly pointed out the need for a more organized, direct and a less wasteful administration of justice. It is not only the man-power of the lawyers which may be lost, but that of their clerks, of juries, court attendants—endless scriveners and recorders. We sat at a hearing the other day and contributed our mite to the 10,000-odd pages of testimony which the government has taken so far in the suit to dissolve the merger between certain great packing interests. This merger has long been consummated in fact if not in name, and will so continue if, in the years to come, the Supreme Court dissolves the paper nexus. Meanwhile, an astute battery of legal talent faced us and did its best to make our few simple observations of fact appear as thumping falsehoods. To get these observations on the record directly would have taken not over five minutes. To get their tortured remains on—after being strained through the objection of learned counsel—took two days, and heaven and the court stenographer alone know how many typewritten pages. It is a fair sample of much corporate law procedure.

The profession of medicine has been touched on earlier. We pass on with a single query. How many surgical operations have been inspired more by the fashion—and the

fee—than by sound common sense in respect to the health of the patient?

Bolstering up the business man

The modern business man has surrounded himself with a growing cloud of professional advisers the value of whose services is somewhat dubious. Production engineers, cost accountants, efficiency engineers, tax consultants, mercantile agencies, statistical services, commercial research organization, business builders, advertising agencies, sales advisers, public-relations counsel, labor-relations counsel industrial detectives—these over and above the time honored run of lawyers, bankers, public accountants, merchandise brokers, engineers, appraisers and investment specialists.

The 1924 ledger of a medium sized manufacturer of textiles, discloses the following overhead outlays:[21]

National Commercial Associations	$ 200
National Trade Association	220
State Commercial Association	100
City Trade Association	50
Board of Trade	125
Sectional Trade Association	1,132
Credit Association	25
National Manufacturers Association	50
Tariff Organization	100
Designers Association	50
Special Trade Association	100
Total "Associations"	$ 2,152
Production, efficiency and industrial engineer	9,000
Reappraisal	3,000
Legal services	18,000
Accounting	2,000
Bonding	2,000
Grand total "services"	$36,152

Well, some of these gentlemen make a real contribution to more economical operation, more intelligent information. But, we suspect, even more of them are just so many parasites hanging upon the industrial structure, their only asset a sound psychological knowledge of how to sell themselves.

Government

If government be classed as overhead service, note must be taken of the wastes of lobbying and political graft. The total of the latter, in America, is set by the Literary Digest at $200,000,000 a year. British railroads were calculated to have spent £90,000,000 up to 1910, in opposing or aiding bills in Parliament.[22] The sheer waste of man-power in manipulating political deals, police protection, special interests, tariff jockeying, to say nothing of the official lobbies of each main industry at Washington, and in state capitols, must run into the tens of thousands of workers. Nor should the idiotic methods by which contributions for political campaigns are usually expended be overlooked. Nor the fact that Attorney General Ekerm of Wisconsin—as the result of a special study—finds that voting by mail with postage prepaid both ways with proper precautions as to signatures, would save one-half the cost of all elections.

Insurance

Insurance as a method of balancing the industrial load—of averaging the lean years with the fat, provides a real public service—particularly in an acquisitive organization of society. The questions at issue are whether the clerical and selling man-power engaged in its upkeep is excessive, and how far a functional society would be sufficiently its own insurer to dispense with it altogether. The United States Government never takes out fire insurance. Its

holdings are so large that it has been found cheaper to rebuild than to pay premiums. Insurance creates nothing, it simply keeps busy a few hundred thousand clerks, actuaries, salesmen, lawyers, printers—making marks in books, and passing pieces of paper from hand to hand. . . . From the aeroplane view, a strange, inconsequential picture.

For every dollar of life insurance paid to the beneficiary two dollars are paid in premiums. This is not a carrying cost of 100 per cent, due to the necessities of larger reserves with an ever mounting number of policy holders, but it is a high cost—too high to pay for a service which is only needed because society is so poorly organized. Totals for 1920 were as follows:[23]

	Total income of companies	*Total paid to policy holders*	*Ratio*
Life insurance	$1,847,000,000	$745,000,000	40%
Fire insurance	$1,074,000,000	$492,000,000	46%

An investigation of twenty-three American and Canadian companies by the United States Bureau of Labor Statistics showed:[24]

Ratio of expense to premiums	—stock companies	37.5%
	—mutual companies	20
	—competitive state funds	12.5
	—exclusive state funds	5 to 7.5

An exclusive state control of insurance only needs the clerical labor represented by not over 7.5 per cent of the premiums collected—while the competitive private company needs 37.5 per cent. When the state took over Workmen's Compensation insurance in Queensland, it proceeded to give double the benefits for the same premium.[25]

Finance

Like insurance, the banker and financier meet a genuine need in modern economic society. Even a functional so-

ciety would demand some sort of a money and credit mechanism, with man-power to run it. One difficulty recognized by economists—particularly Veblen—with current practice, however, is the tendency for bankers to run industries about whose technical problems they know nothing. There have been kings in railroads, steel, tin plate, copper, motor cars who did not know a screw thread from a resistance coil. They have been astute in handling stocks and bonds, but they could not design a hen house. There is a distinct tendency for the investment banker to take a larger control of industrial affairs as against the technical business man. Ford has had some bad moments because of his refusal to follow the tendency. Veblen holds that control by the investment banker is bad for industry—bad for plentiful low cost production—in that it always seeks to restrict output to that point where the largest safe return may be made in dividends, rather than the maximum in public service. In subsequent chapters the actual operation of such restrictions will be more carefully examined. Sufficient to say here that insofar as the man-power engaged in finance tends to cripple rather than promote production, it is wasted man-power.

The arts

The Ten Story Book, No. 538 South Dearborn Street, Chicago, announces: "We will, in the future pay on acceptance for all sex stories, and said acceptance will be made within a week of receipt of manuscript, or same will be returned to author. Non-sex stories of which we are far less in need, will be paid for on publication as in the past." There have been hack writers since Grub Street was a cow path, but perhaps never such a variety of cynical prostitutes as find their way into the popular magazines

of today. Meanwhile the income of the collar designer and the magazine cover mechanic results in country houses and private yachts, while the genuine artist, particularly if he be young and unknown, more often keeps to his attic. A young virtuoso attempting the entry into a concert tour of America has a strict and time honored path to tread which consists chiefly of bribing the several musical journals by means of a sufficient number of paid advertisements to command favorable notices. In brief, art as a free expression of creative impulse is almost intolerably hedged about with commercial consideration, with the result that effort which should normally cater to one of the finest and most profound of human wants is crippled and broken and wasted. Save perhaps in literature, we have no modern art in the sense that the Greeks knew it, the medieval craftsman, or the Renaissance.

It would be interesting to compare the ratio of the overhead services to the total working population now, as against a generation ago. We suspect that such ratio is definitely on the up grade. As the underlying industrial structure throws off more goods per man employed, the increase, instead of going into more sound goods and a consequent raise in the standard of living seems to release an ever accelerating group of overhead workers whose services to the community at large are filled with dubious items. The measure of dubious items in man-power is, of course, quite impossible.

A Summary

A journey through the field of wastes in consumption has necessarily been incomplete, and at times confusing. The main classifications tend to overlap, and figures showing man-power are very difficult to come by. For several

.tems we can make no quantitative estimate at all. In recapitulation, the following table is offered for what it may be worth:

Wastes in Consumption

		Estimated man-power Total	Wasted
1.	The military establishment...........	1,500,000	1,000,000
2.	The opium and cocaine traffic.......	unknown total	
3.	The drug traffic....................	400,000	100,000
4.	Distilled spirits.......................	unknown total	100,000
5.	Prostitution	250,000	150,000
6.	Crime—criminals	320,000	200,000
	—watchers of criminals.........	400,000	200,000
7.	Adulteration	unknown total	
8.	Speculation and gambling...........	unknown total	
9.	Quackery	unknown total	
10.	Super luxuries and fashions..........		6,000,000
11.	Commercialized recreation...........	unknown total	
12.	The overhead services...............	unknown total	
13.	Advertising	600,000	250,000
	Total minimum wasted man-power....		8,000,000

The labor power lost in the narcotic traffic, the adulteration of goods, speculation and gambling, quackery, commercialized recreation, and the perversion of the professions, is impossible to estimate—though in the manufacture of adulterated products alone it must run into the hundreds of thousands, if not into the millions. Super-luxuries plus artificially inspired changes in fashions looks large—too large the critic will hold. It is based, however, on the figures of the Secretary of the Treasury, checked by Professor Bowley's careful figures for England. It includes not only the super-luxuries of the rich, but their cheap imitation as well. Advertising is not discussed until the following chapter, where the total man-power, direct and indirect, devoted to the traffic is set at 600,000. A part of this is necessary outlay, a part of it duplicates with losses

in patent medicines, and super-luxuries. We have cut the total to 250,000 as representing the factor of waste accordingly. We doubt if this is an excessive figure.

The minimum total for such classes of illth as can be segregated, works out to the labor power of 8,000,000 workers. If the unknown classes could be added, the aggregate in our judgment would run above 10,000,000, but it is only an opinion—we have no way of proving it. Is a quarter of the man-power of the country devoted to the making and selling of needless and often hurtful things, an unreasonably high figure? We hope enough has been brought out by way of qualitative explanation to convince the reader that it is not. To Bernard Shaw we leave the final word: "Man is the only animal which esteems itself rich in proportion to the number and voracity of its parasites."

CHAPTER VII

AN ANALYSIS OF ADVERTISING

A rough estimate of the output in newspapers, magazines, books, pamphlets and circularization matter, reveals the fact that nearly two quadrillion words come off the printing presses of the United States in a year's time. . . . Eleven billion linear miles of words—enough to go clean around the solar system. It would take a shell 500 years to go from the first headline to the last. To consume them all, every man, woman and child in the country over seven years of age would have to read some 60,000 words a day—a sizeable book full. And well over half of them are advertiser's copy.

Advertising might be termed the big brother of most of the forms of illth detailed in the last chapter. It is the life blood of quackery, and the patent medicine industry. It enters largely into the output of super-luxuries, fashions, commercialized recreation. It is an invaluable adjunct in mobilizing a nation for war. Though the man-power engaged directly and indirectly in advertising is not so large as in certain other forms of wasteful consumption, nevertheless its power, prestige, and ramifications are such, as to merit a separate chapter. Furthermore, its position is slightly different from the forms of illth heretofore enumerated. It is not an end product. No one consumes advertising directly. It is an intermediary service which points the way to consumption and which enters into the cost of consumption—whether the product be soap, lingerie, motor cars or pink pills. In such cases as we have

estimated the man-power of illth based on the total spent for the product, the advertising staff has already been included, and accordingly an estimate in the field of advertising alone cannot be added—to super-luxuries say—without duplication.

The extent of the industry

Mr. Edward Bok writing in the *Atlantic Monthly* has estimated the total annual outlay for advertising as follows: [1]

Newspapers	$600,000,000
Direct advertising (mail matter, hand bills, etc.)	300,000,000
Magazines	150,000,000
Trade papers	70,000,000
Farm papers	27,000,000
Sign boards	30,000,000
Novelties	30,000,000
Demonstrations	24,000,000
Window displays	20,000,000
Posters	12,000,000
Street car cards	11,000,000
Motion pictures	5,000,000
Programs	5,000,000
Total	$1,284,000,000

Over a billion and a quarter dollars, involving, at an average wage of $2,000, the labor power, direct and indirect, of upwards of 600,000 workers. Mr. Bok's estimate is not excessive, for it checks with all other estimates we have seen, which run in the neighborhood of a billion a year, or better.

Whether this total includes under the caption of "direct advertising" all of the doctrinal matter on and about package goods and bottles, we do not know, but we suspect that it does not. Such outlays are more liable to be charged directly to the cost of manufacture.

The oldest advertising agency was founded in 1864. It has grown to a flourishing concern with an annual turnover of $15,000,000. Twenty-five years of advertising space in the *New York Times* reveals the following record:[2]

	Agate lines
1896	2,200,000
1900	4,000,000
1905	6,000,000
1910	7,600,000
1915	9,700,000
1916	11,600,000
1917	12,500,000
1918	13,500,000
1919	19,700,000
1920	23,400,000

The phenomenal increase in 1919 was not unique with the *Times*. It reflected a nation-wide movement. In that year, the government ruled that advertising outlays were not subject to income tax, but were a legitimate business cost. Manufacturers with the profitable war years reflected on their balance sheets, were only too glad to put into advertising what otherwise they would have to pay to the government, in the form of excess profits taxes. This fortunate circumstance gave advertising a lift upstairs, from which, broadly speaking, it has never been forced to descend.

So-called "national advertising," which discloses the merits of a single product to the whole country from California to Maine, amounts to over $600,000,000 a year—or about one-half the total for all advertising. A poster campaign covering the country with 17,196 lithographs, duly placed at proper scenic spots along the public highways, will cost today about $140,000 per month to operate. The Thomas Cusack Company with 8,000 on their payroll, account for over half of all the outdoor traffic.

More than half of the output of the country's printing presses is advertising matter. In newspapers, the ratio of advertising space to total space runs from 40 to 75 per cent. The *New York Times* consistently maintains the latter figure. Thus of the 2,600,000 tons of newsprint pulp consumed annually—well over 1,500,000 tons goes into advertising.[3] A single New York newspaper will annually account for upwards of 2,000 acres of forest land in wood pulp consumed.[4] It has been estimated that 80 per cent of all mail matter consists of advertising material.[5] The proportion of this which finds the waste basket unread must be considerable. One concern appropriated $12,000,-000 for advertising in 1923. In the same year the Investment Bankers Association spent $40,000,000.[6] Meanwhile, a single page in the *Saturday Evening Post* costs $11,000 per insertion. The Wrigley gum electric sign at Times Square, New York, consumed $108,000 worth of current a year.[3] On the top of the Cleveland Discount Company appears this legend: "This sign burns more current than the entire town of Elyria." Elyria has a population of 30,000.

America has perhaps pushed the technique of advertising to the highest point ever achieved, but in output per capita England is almost on a par with us. According to Hartley Withers, the total British bill is £100,000,000 a year, or almost half a billion dollars.[7] The British taste in patent medicines, however, has always been exotic.

Applied psychology has no firmer friend than the advertising agency. As Veblen says: "The day's work of an agency—modern style—will necessarily run on the creative guidance of habit and bias by recourse to shock effects, tropismatic reactions, animal orientations, forced movements, fixation of ideas, verbal intoxication. . . ."[3]

It is reported that the "film on teeth" series was concocted by a young psychologist who had specialized on suggestion.

The economics of advertising

The advertising industry, viewed from an aeroplane, would be seen to consist of some 600,000 workers—writing copy, canvassing for clients, designing layouts, painting pictures, engineering campaigns; supported by printers, compositors, paper makers, chemical workers, lumber jacks, railroad men, carpenters, sign painters, electricians, lithographers, bill posters, wood workers, paint makers, mail clerks, letter carriers, telephone operators, stenographers, bookkeepers, psychologists, and efficiency experts—to name only a few. Advertising keeps the whole 600,000 busy. If they lived in Denmark—where advertising is restricted—they would have to turn to some productive occupation. In other words, the industry reaches down into the ranks of the gainfully employed, picks up a half million odd workers, and says to them "Now shout! and furnish the paper, ink and paint for shouting!"

Meanwhile the purchasing power of the country does not materially vary. There are just so many dollars to be spent. Advertising creates no new dollars. In fact by removing workers from productive employment, it tends to depress output, and thus even lessen the number of real dollars. What it does do is this. It *transfers* purchasing power from A to B. It makes people stop buying Mogg's soap, and start buying Bogg's soap. Every drug store carries some 60 kinds of soap and 35 kinds of tooth paste. It makes people stop buying shaving soap in mugs, and starts them buying it in tinfoil sticks. It can make A rich and ruin B. With a fixed and relentless number of dollars to play with, it can shift these dollars all over the map. But as Veblen points out, the game is played in a

closed market. You cannot lift yourself by your bootstraps. Further, "in such a closed market, the volume of purchasing power will be narrowed by approximately the aggregate cost of salesmanship."[3] And Veblen quotes patly enough a remark at a recent (1923) conference of one of the big New York agencies: "Blank has the market, it is our problem to dislodge him."

Utilities in advertising

Advertising would not disappear in a functional society. It would simply shrink to perhaps 10 per cent of its present volume and let the other 540,000 workers go back to productive occupation. The function of advertising, as we see it, lies in the dissemination of news about coming events, new inventions, new products. Theatre and concert advertising, new books, a campaign for public hygiene, a safety campaign, six months space for a new synthetic food, for an alcohol engine that was cheaper than gasoline, for a reliable device for controlling births—would be tolerable and welcome. National advertising for the education of the consumer, if conducted by some impartial and scientific body might conceivably provide a great channel for eliminating wastes in consumption. But nine-tenths and more of advertising is largely competitive wrangling as to the relative merits of two undistinguished and often indistinguishable compounds—soaps, tooth powders, motor cars, tires, snappy suits, breakfast foods, patent medicines, cigarettes.

The Joint Commission of Agricultural Inquiry phrases a more cautious conclusion: "The Commission finds that advertising contributes much to waste in the distribution of farm products. A community can absorb only a limited amount of merchandise, and where trade is diverted by advertising from one store to another, it must increase the

ratio of operating expenses of one distributor, if the ratio of the other is decreased. There is an element of service in advertising by which consumers are notified of the presence of goods they desire, are reminded of their needs, and are educated to the use of better materials." [8]

It has been widely claimed that advertising is a public economy because it makes for large scale production, thus bringing about lower unit costs. By increasing sales through advertising, factories are enlarged, mass production instituted, overhead reduced, and manufacturing economies introduced. This is no mean argument if true. The difficulty is to find concrete examples of such cost reduction. The Joint Commission of Agricultural Inquiry after very extended research says flatly: "It is significant that those trades which are the most persistent advertisers carry higher percentages of operating costs than other lines.'"

And again, the attempt of advertisers to gain a national as against a local market for themselves, may often involve, through cross-hauling and uneconomic location, sufficiently high costs of distribution to offset the economies in low factory cost. We believe there is some virtue in the low unit cost theory, as a theory, but we have yet to see the conclusive evidence supporting it. Even if proved, the savings would only apply to a limited portion of the whole advertising field.

The technique of advertising

Granting an element of utility in the public announcement factor of advertising, and possibly some savings, as yet unproved, by virtue of the low unit cost theory, let us examine in some detail the day by day operation of the industry, and the technique upon which it rests.

Initially a word should be said as to the wastes of that

technique as admitted by advertising men themselves. In the event that the whole theory of advertising was sound from the public service standpoint, there would still remain a large element of leakage and loss through misdirected effort. Says E. G. Boos in the *Annals:* "Every publication naturally thinks that it is the preferred medium of the home. As a matter of fact there is a waste at this point (in duplication) amounting to hundreds of millions of dollars each year. It takes a very careful survey to determine which of these channels is navigable and profitable." [6]

Dr. Paul Cherrington has shown the pressing need for research into market demand in various geographical sections before broadcasting advertising. Women's blunt-toed pumps have no market east of Pittsburgh. A shoe manufacturer with such a line would be throwing space away in eastern territory. The foreign sections each have their unique preferences. The more up-to-date agencies are solving these problems for their own particular clients through intensive research. The bulk of the craft is still heedless of the waste involved. Consider the single factor of the advertising mail matter which passes over one's desk in a given week. How much of it has a genuine appeal, and how much is dropped into the waste basket with a yawn? How much is dropped in unopened? Out of 274 pieces of mail matter addressed to the author in March and April, 1925, 132 pieces—or 48 per cent—were advertising matter without interest or value to him. The *National Advertiser* in its issue of January, 1925, says editorially: "One-tenth of all advertising published has been used, efficiently for the advertiser, the rest is a partial loss. This is the consensus of a group of practical advertising men discussing the speech of President G. Lynn Sumner before the New York Advertising Club recently." A 10 per cent efficiency

would thus seem to be the ratio assigned by the trade itself. A great deal might be done in the way of eliminating lost motion if advertising were regarded in toto as an accredited technique and more intelligence applied in the placing of it. In the nature of the case, however, it is probable that such savings would simply be applied to more expensive and more high-powered competitive campaigns.

The factor of artificial stimulation

We clip the following from Don Herold in *Life:*

"I have been eating three or four times as much bread since somebody started to advertise 'Eat More Bread.' Bread and raisins. (Somebody else is advising me to eat lots of raisins. It increases the zinc or copper in your system. No, I am getting the raisin campaign mixed up with the Zinc Association advertising. I believe it is lead that you get from raisins.)

"But I have come to the conclusion that I am going to have a funny diet and a funny existence if I take all the advice that I am getting in the advertisements. 'Ride on Trains,' says one great series of advertisements. The railroads must be behind that, although, for all I can tell, it may be the plush manufacturers. They may have it figured out that if more people ride on trains, these people will wear out more plush in seats in railroad coaches, and the railroads will have to buy more plush.

"But I get a conflicting urge from that other great series of advertisements which tells me to 'Stay at Home More,' and which pictures so passionately the comforts of home. I had my grip all packed the other day to ride on a train (just anywhere, so it was on a train), when I happened to read one of those stay-at-home ads, and I immediately unpacked my things and put on my house slippers and—I have it! It is the House-Slipper Manufacturers' Association that is running those stay-at-home ads!

"If I eat more pie as the National Guild of Pie Craftsmen advocates, and more spaghetti as the North American Alliance of Spaghetti Weavers desires, and more beans as

the Bean Growers insist, and more ice cream as the Ice Cream Freezer Cog Wheel Founders' Association admonishes, and more bananas as the Canadian Banana Growers recommend, and more asparagus as the International Asparagus users counsel, I think I'll be in a position to take the advice of that latest campaign on which I have seen advance proofs: 'Use More Coffins.'

"The source of some of this indirect and abstract urging is so mystical and far-fetched as to be almost irritating. I thought it was the candy manufacturers who were telling me to 'Eat More Caramels,' and discovered a tiny signature at the bottom which indicated a state dental association as the author of the series.

"And the thing that has come nearest to bewildering me beyond recovery has been to read, during the same day an advertisement by the Trouser Manufacturers beseeching me to 'Sit Down More,' and another advertisement by the Shoe Sole Association of New England convincing me that I should 'Stand Up More.'"

Christine Frederick has been at pains to list a few of the specific national campaigns which have recently been launched.[6]

Flour millers—"Eat More Bread." Goal, per capita consumption of 220 lbs. per annum.
Milkmen—"Drink More Milk." Goal, one quart per capita per day.
Butter makers—"Eat More Butter." Goal, the Australian level, now 10 lbs. above the United States level.
Cheese makers—"Eat More Cheese." Goal, the Swiss level, 22 lbs. above United States level.
Cheap silk manufacturers—The displacement of cotton goods.
Aluminum manufacturers—The displacement of enamel ware.
(This drive is being met by a very expensive counter offensive on the part of the enamel ware manufacturers.)
Belt manufacturers—The displacement of suspenders.

Rug manufacturers—The displacement of carpets.
Cretonne manufacturers—The displacement of lace.
Chip soap manufacturers—The displacement of laundry soap.
Meat packers—"Eat More Meat." Goal, 179 lbs. per capita per year (the level attained in 1900).

This hothouse forcing is of the very essence of modern advertising: "Where the commercial motive takes the initiative, there can be no adequate security that the articles which pass as new elements into a standard of consumption shall be wealth, not illth. Where an invention is stimulated to meet a genuinely 'long-felt need,' the generality and duration of that need may be a fair guarantee of utility. But this is not the case where the supply precedes and evokes the demand, the more usual case under developed commercialism." [9]

Jacob Billikopf, director of the Federation of Jewish Charities in Philadelphia, in a recent report (April, 1925) on family budgets and the cost of living, dwells at some length on the relentless advertising pressure upon the working classes to buy, buy, buy. "The very men who preach thrift spend thousands of dollars trying to make poor men miserable if they do not buy things they cannot afford. . . . I sometimes wonder whether there is not far more danger of a social revolution caused by making people want intensely what they cannot buy than of one caused by talking to them about theories of distribution."

Roughly the advertiser operates his forcing methods through capitalizing the following human frailties: shame, cupidity, fear, vanity, curiosity—particularly sexual, superstition, and mother love. An analysis of the 45 advertisements in a New York elevated car on October, 1923, the 116 advertisements in *Hearst's International Magazine* for November, 1923, and the 82 advertisements

in the *Smart Set Magazine* for November, 1923, give this result:[10]

Analysis by Product

	Total
Correspondence Courses, Books	44
Beauty and Cosmetics	43
Jewelry	28
Automobiles and Novelties	21
Patent Medicines and Lost Vigor	19
Music, Movies, etc.	16
Food	12
Clothing	12
"Earn More Money"	11
Investments	7
Laxatives	6
Shelter	2
Tobacco	6
Gum	2
Miscellaneous	15
Total advertisements	244

Analysis by Appeal

	Total
Appeal to vanity	39
Appeal to shame	22
Appeal to sex curiosity	17
Appeal to cupidity	17
Appeal to fear	8
Palpably false	44
Harmful products (not including tobacco)	28

Of the 244 advertisements, 233 had to do with competitive products, while 5 announced a genuinely new product, and 6 carried genuine news value. It cannot be maintained that this analysis passes in any final way upon the advertising reviewed. It is merely one investigator's reaction. It does, however, give a rough cross section of what one finds about him in the day-by-day run of advertisement.

The fear motive operates in such campaigns as the Forhan's "4-out-of-5-have-pyorrhea," and in the ingenuous Listerine "halitosis" offensive. Neither can cure the underlying disease, but both imply cure without specifically saying so, and both throw the fear of God into the populace. The threat of old age, lost vigor, decline in physical freshness and beauty is exquisitely cared for by the astute advertiser. Mr. Earl E. Lindeman (with muscles flexed)

takes charge of the shame complex in the physically weak as follows:

"I like to get the weak ones. All I ask is 90 days. When I'm through with you, you're a real man. Your deep, full chest breathes in rich pure air. Your huge square shoulders and your massive, muscular arms have that craving for the exercise of a regular he man. You have the flash in your eye and the pep to your step that will make you admired and sought after in both the business and social world."

If Mr. Lindeman had only added a word about capsizing the ladies, the copy would have been perfect. But perhaps this is sufficiently implied. And Mr. Lindeman and his friends know well enough that if your shoulders are not huge, and your eye flashing at the end of 90 days, you are going to keep jolly well quiet about it. The advertiser knows that no one advertises the fact that he has been a gullible fool.

Sidney and Beatrice Webb summarize a further point in the technique of artificial stimulation: "When a citizen has become possessed of an instrument, such as a sewing machine or typewriter, or motor car, or what not, capable of doing him efficient service for ten years, extraordinary efforts are made by means of advertising to induce him to purchase a new model every year; and changes are made—for better, for worse—in the instrument, to persuade him that it has been improved." [11]

What has this factor cost the American people in motor cars alone? Consider the superfluity of goods which this forcing of turnover, this breaking down of "sales resistance"—as it is known in the jargon of the trade—entails. We are deluged with things which we do not wear, which we lose, which go out of style, which disappear anyhow—fountain pens, jewelry, patent pencils, straw hats, mouth

washes, key rings, hair tonics, tooth pastes—endless jiggers and doodads and contrivances. Here it almost seems, the advertiser plays on the essential monkey within us—grabbing for a rose only to pick it to pieces, petal by petal.

A new French perfume was recently imported. It carried a moderate cost as perfumes go, and was to be sold at an average price. The promoters went to an agency for marketing suggestions. The advice given was technically sound. Appeal straight to snobbishness. Never mind moderate cost, make it the most expensive perfume on the market. Milady must have it—it costs more but it is worth it! The advice was adopted, and the perfume has become a large money maker.[12]

Articles of intimate personal use and of conspicuous personal use lend themselves particularly to advertising—cosmetics, jewelry, snappy suits, sheer silk stockings. These things appeal to the young, as the health and vigor program appeals to the ageing. Thus the industry works on a happily balanced load basis. "So the publicity agents of the sovereign remedies 'throw a scare' into the old generation, while the salesmen of the proprietary beautifiers work on the aspirations of youth"[3]—that eternal youth which feels so pathetically and earnestly that it must keep up with the procession.

Package goods

Containers account for one-half the manufacturing cost of what are properly called package goods. In cosmetics and remedies, the ratio will run higher. A vast traffic has been built up—largely through advertising—in "selling the package," rather than in selling what it contains. The glitter of a shaving stick holder, the unique shape of tonic bottles, the goldfoil about a cigar, monogramed cigarette boxes, powder puff containers, all lead the eye away from

the underlying product, and fasten it upon the splendor and the glitter of the container. "It is also the confident testimony of persons in a position to know, that except for line, color, shape and surface of the containers—and apart from verbal differences in the doctrinal matter which surrounds them—the distinctive character in these various articles of intimate personal use is something very difficult to get at." [3]

Art in advertising

It is confidently claimed that advertising has quickened the artistic conscience of America. It is perfectly true that the quality of design has improved vastly since the wood cut era of patent medicine illustrations in the sixties. The eye is caught, and often it is pleased. William McFee, the distinguished English novelist, takes a somewhat broader point of view, however: "Which leads me to note a very powerful and subtle influence tending to blind us, all day and every day, to inferior values. I mean advertising. You must not misunderstand me. I am not going to inveigh against the financial power of advertisers, or the legitimate announcements of special products, or even against the ruthlessness of those interests who conceal the countryside from the traveler by billboards that are neither clever nor interesting. I am far more interested in the workings of advertising upon language and manners and character. I want you to note that the present trend of high class advertising makes it increasingly difficult to form a judgment about anything. You will find yourselves presently in a world concealed behind advertisements. . . ." [13]

Smooth prose, pretty colors hiding false values. The copy writer as a rule knows little of the technical composition of the product he is writing about, and the hack artist

likewise. Their job is to put it over, regardless of the utility or the quality of the article. True art is direct, honest, undraped. One wonders in the end, if advertising has not done more to standardize the magazine-cover pretty girl school of art, than genuinely to improve public taste and discrimination.

We do not admit, however, anything but insult and degradation in signboards. The number of linear miles of American scenery which have been ruthlessly debauched by them passes computation. On the east side of the Pennsylvania tracks, between Washington and New York, there are 5,000.[10] The Mohawk trail through the Berkshire hills in Massachusetts has been ruined by them. In this field, we are almost ready to renounce our law-abiding citizenship, and, like the Florida business man recorded by J. Horace McFarland in the *Annals,* pack a crowbar in our motor car with which to rip down boards along the road from office to home! McFarland holds that billboards on public highways defeat their own end; that indignation outweighs the laws of unconscious suggestion.[14]

Truth in Advertising

It would not be fair to a great industry to evade mention of the "Truth in Advertising" movement, which has gathered considerable momentum in recent years. The movement has made great strides in eliminating bold-faced lying. It has done no little to discourage the production of notoriously deleterious products. It has tended to improve quality. But we fail to see how it can affect the fundamental economic issues involved. The elimination of certain forms of cheating and chicanery is good from the public standpoint, but the public will have to carry the load of the 600,000 nonproducers just the same. They may turn from the stimulation of "Black Draught" and

"baby killer" soothing syrups; but only to increase the stimulation of svelte lines, motor cars, and skins you love to touch. An advertisement was recently noted to the effect that "hard water had ruined more hands than hard work"—an advertisement put out by a water-softening concern. It had duly passed the official "Truth" censorship. A man of science wrote to the censorship and inquired what chemist had verified this statement. As a chemist himself he knew that it was not true. Nothing is harder than sea water, and nothing is better for the skin. The Truth movement officials replied that they had no technical backing for the statement, and invited the man of science to furnish the necessary vouchers![15] Yes, one inclines to agree with Mr. Donnelly, one of the Prophets of the movement: "The intangible, unseen, indeterminate value of the Truth Movement has already been shown in its general activities."[6] There is a sharp distinction between publicity devoted to genuine public education—say that of the Anti-Tuberculosis Association—and puffing your own goods. Why do you puff? Not to educate disinterestedly, but to make money. In the long run you can only be sincere about your balance sheet. The Truth Movement is thus caught in a paradox. The professions have grasped the psychological implications of this paradox clearly enough, and have banned advertising. A good professional man is known by his works, not by proud words.

Conclusion

In America one dollar is spent to educate consumers in what they may or may not want to buy for every 70 cents that is spent for all other kinds of education—primary, secondary, high school, university.[16]

And yet when all is said and done, advertising does give

a certain illusion, a certain sense of escape in a machine age. It creates a dream world: smiling faces, shining teeth, schoolgirl complexions, cornless feet, perfect fitting union suits, distinguished collars, wrinkleless pants, odorless breaths, regularized bowels, happy homes in New Jersey (15 minutes from Hoboken), charging motors, punctureless tires, perfect busts, shimmering shanks, self-washing dishes —backs behind which the moon was meant to rise!

"Think of the people to whom your bottles of footle go! Think of the little clerks and jaded women and over-worked people. People overstrained with wanting to be. People in fact overstrained. . . . The real trouble of life isn't that we exist—that's a vulgar error; the real trouble is that we don't really exist and we want to. That is what this—in the highest sense—muck stands for! The hunger to be—for once—really alive, to the finger tips." [17]

CHAPTER VIII

IDLE MAN-POWER

We come to the second great channel of loss and leakage in the theory of waste as outlined—of which man-power devoted to illth, including a proportion of advertising, constituted the first channel. From the aeroplane view, it was noted that certain able-bodied adults on any given working day were doing nothing. They were consuming—some more, some less—but their productive output is zero, including not even illth. In this chapter we will attempt a rough appraisal of their classes and their numbers.

The word idleness gives the impression of laziness, lethargy, the refusal to work. As a matter of fact the bulk of the nation's loss due to idle workers is a purely involuntary matter. Men are idle not because they want to be but because they cannot get a chance to work, or because they lie sick or injured by virtue of preventable causes. The voluntary idle, as we shall see, constitute only a small fraction of the total—the idle rich, the hobo, a certain amount of shop absenteeism.

UNEMPLOYMENT

The chief loss and the most obvious one is, of course, unemployment. The Federated American Engineering Societies classify it into four main heads: [1]

1. Intermittent unemployment. Temporary lay offs.
2. Seasonal unemployment. Shops or fields busy in winter and dull in summer, or vice versa.

3. Unemployment due to the business cycle. Little work in panic times, plenty of work in boom times.
4. Residual unemployment. The permanent reserve of labor always unemployed.

To this list we may add another item:

5. Unemployment due to labor turnover. Work lost by shifting from job to job.

As with most schemes of classification, these five classes tend to overlap, to merge one into the other. We shall try to keep them as distinct as possible, but, as in the case of the classes in wastes in consumption, we cannot always be successful.

Intermittent unemployment

Not many figures are available under this head which deals with temporary lay offs. The Federated Engineering Societies illustrate the case with the frequent shutdowns for half days and single days in the bituminous coal industry, and with special studies in other industries as follows: [1]

Industry	*Number of Employees Studied*	*Per Cent of Full Time Worked*
Paper box	4,311	90%
Women's clothing	6,772	91%
Confectionery	12,152	87%
Overalls	6,546	87%
Brick	....	85%
Chemical	....	84%
Glass	....	87%

The chief causes for temporary lay offs appear to lie in car shortages, delayed deliveries of raw materials and fuel, and arbitrary restriction of output in order to keep up prices. If the above figures are typical they indicate a loss of one day's work in ten, due solely to intermittent employment.

Seasonal unemployment

Many studies have been made in this field. Bituminous coal mining has a seasonal factor which accounts for much unemployment. In the last 30 years, the miners have averaged 93 days of idleness out of a possible 300, or nearly one-third of all their working time. Out of a total working force of 750,000 miners, this is the equivalent of nearly 250,000 men always idle in the soft coal industry.[2] The figures include intermittent as well as seasonal unemployment, but the latter is, of course, the chief factor.

The Federated Engineering Societies have made a special study of the building trades, an industry which has long furnished a classical example of seasonal operation.[3] They found that as a general rule the building trades only work at full time from 3 to 5 months in the year. The largest per cent of unemployment comes during the winter months, December to March, but other months are by no means free. In a total of 27 building trades studied, an average of 31 per cent of possible effective working time was lost—about 100 days per year—a slightly worse showing than in the soft coal industry. The total number of workers in these trades aggregated, in 1920, 2,468,000. On a 30% basis, it follows that, on the average, over 600,000 men in the building trades are always idle due to seasonal fluctuation. The irregularity affects not only the carpenters, masons, plumbers and others actually on the job, but reaches into the supply industries—brickmaking, lumber milling, steel milling—which lie back of construction work, causing seasonal idleness here as well. Taking the full year's production of building materials as 100%, monthly production varies from about 4% in February to 10% or 11% in June—in other words nearly 3 times as much building materials are turned out in June as in

February, presumably causing 3 times as many workers to be employed.

The Federated engineers condemn these seasonal fluctuations out of hand as largely unnecessary. "Custom, not climate, is mainly responsible for seasonal idleness in the construction industries." The art of construction has advanced to such a point that the effect of bad weather can be greatly reduced. Steel and concrete can go forward at low temperatures with certain safeguards. The more progressive contractors have already solved the problem of the balanced load the year around.

Of course farm work has always been highly seasonal in character, requiring much labor in the peaks of planting, cultivating and harvesting, and far less at other times. This is a condition which is largely inevitable, however, and can only be solved by co-ordinated national planning. The Pharaohs solved it by using farm labor to build the Pyramids when the Nile was low, thus balancing the seasonal load, but not, it must be admitted, increasing the national wealth to any extent!

A study of payroll data in the manufacturing industries of the United States indicates that fluctuations in the total number employed during a given year, in the aggregate, are the equivalent of from 1,500,000 to 1,750,000 workers always idle.[2] That is, out of a total of 11,000,000 normally employed in these industries, seasonal fluctuations force the equivalent of 1,750,000 of their number to be always idle, on the average. Mr. Ethelbert Stewart in commenting on this study is careful to point out that it does not include absence from the payroll by reason of sickness, accident, or labor turnover, nor does it include lay offs of under 3 days duration, thus apparently not duplicating with the factor of intermittent employment. Clothing workers are idle 31 per cent of the year and shoe workers

35 per cent of the year—though we wear clothes and shoes the year round.[4]

Certain seasonal variations are inevitable. To hold all unemployment due to this source as waste would be absurd. But certainly a large proportion is due to custom and habit rather than to industrial necessity, and, with intelligent planning, could be eliminated.

Cyclical unemployment

The National Bureau of Economic Research, which, under the direction of Wesley C. Mitchell, has made the most careful studies of the business cycle yet undertaken, estimates that the depression of 1921 caused a diminution of approximately one-sixth of the total volume of industrial employment in the United States, or the equivalent of the enforced idleness of some four to five millions of workers.[5] The principal sufferers were miners, railroad workers, and those engaged in manufacturing industries. The Bureau further concludes that production—in a year of business depression—runs from 15 to 20 per cent behind the best years, and from 8 to 12 per cent behind the moderately good years. The course of the depression of 1921, as reflected in the number of workers on all factory payrolls, is strikingly shown by the Bureau as follows:

1920	First	quarter	11,149,000
1920	Second	"	11,334,000
1920	Third	"	11,370,000
1920	Fourth	"	10,507,000
1921	First	"	9,189,000
1921	Second	"	8,648,000
1921	Third	"	8,460,000
1921	Fourth	"	8.532,000
1922	First	"	8,621,000

From the third quarter of 1920 when 11,370,000 factory

workers were employed, the number dropped to 8,460,000 in the third quarter of 1921. The loss of nearly 3,000,000 was primarily due to the business cycle factor, as the seasonal factor would tend to be the same in identical quarters (July-September). Thus over one-quarter, or nearly 3,000,000 of all factory workers, lost their jobs by reason of the business depression. When to this is added those thrown out of work in the mining, transportation and other industries—the total of perhaps 5,000,000 is arrived at.

A survey made by the United States Employment Service in January, 1921, found 6,071,000 workers employed in specified industries as against 9,402,000 employed in the same industries in January, 1920—a loss, due to the depression, of 3,331,000 workers.

While in normal years—if there can be said to be such a thing as a "normal year" in modern business—there is no idleness caused by the business cycle, in such panic years as 1893, 1907, 1914, and 1921, millions of unemployed will be walking the streets, their labor power useless and wasted, suffering from the want of goods which they are not permitted to produce.

Residual unemployment

Even in the most prosperous of years, and in the busiest season within those years, there still remain upwards of a million workers jobless. Some of these fall perhaps into the category of the "unemployable," having been permanently broken in the industrial mill. But always there is this reserve army. The Federated Engineering Societies estimates it "at least one million." [1] Mr. L. W. Wallace adopts the same figure. Other estimates have run as high as 1,800,000.[6] Undoubtedly the lowest point this reserve ever reached was during the latter months of the war.

Turnover losses

Mr. James D. Hackett in his report to the American Management Association estimates that the annual turnover in manufacturing industries is responsible for an average cost—in breaking in new employees, spoiling materials, etc.—of $100 per new man hired, making a national loss of almost a billion dollars. We are not concerned primarily with the money loss due to breaking in new men, but it is clear that a loss in efficiency, in operating time and in materials must occur whenever idleness takes place—whether it be by reason of labor turnover, unemployment, strikes, lockout or sickness. When the balanced operating load is interrupted, in whole, or in part, *in addition* to the man-power lost through idleness direct, time is lost by reason of stops, starts and in the instruction of new workers.

Mr. Hackett's figures of 9,000,000 employed in manufacturing industries works out to a turnover ratio of better than 80 per cent—which seems to be rather under than over the generally accepted ratio for modern industry as a whole. Broadly speaking, turnover studies show that for every 10 men on the payroll at the beginning of the year, 10 new men are hired and 10 old men are fired (or quit) during the year, to keep a force of 10 men still working at the end of the year—or a turnover ratio of 100 per cent.

Florence, in his *Economics of Fatigue and Unrest,* shows that the rate of turnover in American factories from 1910 to 1919 has varied from 63 to 201 per cent per year, and maintains, furthermore, that with proper management, turnover should not exceed 25 per cent per year. In the metal trades industry the Hoover engineers found an annual turnover of 160 per cent, with one plant running up to 360 per cent. On the Great Lakes the turnover in passenger

and freight steamers reached, in 1917, the phenomenal total of 818 per cent. The turnover in railroad maintenance work is in the neighborhood of 200 per cent, while for railroad conductors it is only 5 per cent—showing the tendency for turnover to increase as work becomes progressively unskilled. The average annual rate of turnover in England has been estimated at 111 per cent. Seasonal fluctuations, sickness, accidents, and residual unemployment account for much of the turnover loss, but *over and above this amount*—which we consider elsewhere—there is a factor of idleness due to turnover which is mainly represented by days lost in workers drifting from plant to plant because they are fired for unsatisfactory performance, or because they are dissatisfied and have quit. There is no way of estimating accurately what this loss amounts to in man days—but what one of us, who has had any practical experience with the personnel factor of business, will not say that it is large? It has been estimated that the average time lost between quitting one job and taking a new one is two weeks.[7]

We have then five classes of unemployment—four distinct, and one residual of the four. On a given working day men (and women to a less degree) are idle because:

1. They are temporarily laid off—for half days, single days, two or three days—due to car shortages, plant breakdowns, lack of raw materials or orders.
2. They are seasonally laid off—for weeks, months, due to natural causes as in farming, building construction (in part), lumbering, etc., or to artificial causes due to style changes or just plain habit as in the clothing industries, women's shoes, mining, and much building construction.
3. They are cyclically laid off—for months on end, due to the operation of the business cycle with its boom years and its years of panic and depression.
4. They are out of work for an average period of 2

weeks as they change from job to job. And on the average for every job in the country there is one job change a year. Hiring, firing and quitting go on in the best of years and the best of seasons.

5. As a lowest common denominator of the above, there is always a residual army of unemployed of at least a million workers.

The man-power loss due to each of the above can never be estimated with any great accuracy, but from such studies as have been made, it appears that:

1. The *intermittent* loss is probably 5% of all time for perhaps 20,000,000 workers in the manufacturing, mechanical, mining and transportation industries. If 2% is preventable through improved industrial planning, the average man-power now wasted from this source is 400,000.
2. The *seasonal* man-power loss has been demonstrated as

1,500,000	workers in manufacturing
600,000	workers in construction
250,000	workers in soft coal
2,350,000	total

   The greater part of this loss is preventable according to the conclusions of engineers who have made intensive studies in these industries. Would 2,000,000 be an unreasonable figure for a minimum of man-power always idle the country over on the average due to seasonal fluctuations?
3. The *cyclical* man-power loss while huge in panic years, does not aggregate so much when spread over all years. A conservative estimate based on a study of the business cycle for the last generation indicates a permanent average loss to production of some 300,000 workers.
4. The *turnover* loss may be roughly estimated by taking say a 100 per cent turnover on 30,000,000 industrial workers (not including farmers) for a 2 weeks period.

30,000,000 workers absent for 2 weeks a year is the equivalent of 1,200,000 workers always idle.

5. *Residual* unemployment cannot be added *in toto* to the above estimates without duplication, and should not be included in our totals accordingly.

Strikes and Lockouts

The United States Bureau of Labor Statistics shows, for the years 1916 to 1921, an aggregate of 10,742,738 employes involved in strikes and lockouts, or an average of 1,790,000 per year. The average time lost per man was 30.3 days, or 53,700,000 days per year. Dividing this total by 300 working days in a year, we get the equivalent of 180,000 workers *always idle* as a result of strikes and lockouts. The rate for the United States during these years was 1.25% of the total workers employed in the industries studied. The rate in England runs about 1.33%—which constitutes a pretty close check on this factor of idleness.[7]

For the 15 years from 1891 to 1905 the average number thrown out of work due to strikes and lockouts per year was about 400,000.[1] The loss from this source is very definitely on the up grade—1916 to 1921 averaged nearly 1,800,000 workers as we have seen.

As a corollary of strikes, we must remember the overhead man-power engaged in connection with industrial disputes—the private guards, gunmen, professional strikebreakers, detectives, "inside men," and labor spies. Jean E. Spielman has estimated that three of the major agencies—Pinkerton, Burns and Thiel—have listed as high as 135,000 men on their combined payrolls, operating 100 offices, and 10,000 local branches, with 75 per cent of their operatives under cover in various labor organizations.[8] A functional society would give cause for few strikes, and would not tolerate parasitic labor in the form of professional strikebreakers.

On the whole it appears that the direct loss of man-power from strikes is small as compared with other losses in the field of idleness, and has received a quite undue proportion of censure from those who have the industrial structure more or less in charge.

Absenteeism

This is a factor which can never be altogether abolished, but a somewhat more human industrial organization would doubtless reduce it. It consists of just plain staying at home. A questionnaire sent to 4,800 industrial workers in Germany recently disclosed the following results: [9]

Industry	*Number of Workers*	*Per Cent not Interested in Work*	*Per Cent Indifferent to Work*
Mining	2,000	60%	17%
Textiles	1,000	75	14
Metal working	1,800	57	17

Nearly 80% of these workers were not interested in, or indifferent to, their jobs. Would America show a better ratio? One doubts it. The reaction of fundamental human nature to modern industrial methods is probably fairly uniform the world around.

This active disinterest or indifference accounts for a large amount of deliberate idleness—even in the face of the wage loss which such absenteeism must entail. Figures are hard to find in this category. Florence estimates total absenteeism at about 5% of the working force but this includes strikes, lockouts, and sickness. If one worker out of a hundred is always absent on the average because he dislikes his job, the total, in the United States would reach probably a quarter of a million on any given working day. One can only guess; there are no established

facts which we have been able to find. But we know that square pegs in round holes account for a large total of wasted man-power.

Preventable Accidents

Every year in the United States there are upwards of 25,000 fatal accidents in industry, 700,000 accidents causing more than 4 weeks' disability, and at least 2,000,000 accidents causing more than 1 day's disability. Mr. Gerald Billhouse, His Majesty's Chief Inspector of Factories and Workshops, has claimed that 75 per cent of industrial accidents could be eliminated with reasonable precautions. Messrs. Cheney and Hanna, following their studies in American industries, say "largely eliminated." In plant after plant where safety campaigns have been inaugurated the accident rate has been cut in half and more. Machine tool shops with safety systems show an accident rate of 42.1 per 1,000 employes; those without systems, a rate of 123.4 per 1,000. Cutting the length of the working day from 12 to 10 hours to 8, always reduces the accident rate.[7] In the last 10 years, there has been a 75 per cent reduction in the accidents of the du Pont Company due to the installation of safety devices.[10]

The Federated American Engineering Societies estimate the total time lost due to industrial accidents at 296,000,000 man days, or the equivalent of nearly a million workers (on a 300 day to the year basis) *always idle.* It is further estimated that 75 per cent of this loss could be avoided by suitable precautions. (All authorities seem to agree on the 75 per cent margin.) It follows then that the net man-power lost, due to preventable accidents, aggregates over 700,000.

As an offset, we must consider the man-power necessary to install and maintain the safety devices. And as an off-

set against this new cost, we must consider the savings in stops and starts in the factory, now due to accidents, the savings in medical care, and in the overhead cost of claims and compensation collection. Perhaps the second offset would balance the first. If not, it would go a long way toward balancing it. Certainly the loss by virtue of preventable accidents, with due allowance for the cost of safety devices, must be upwards of 500,000 workers a year unnecessarily idle.

This loss is roughly checked by the figures of Carl Hookstadt who has estimated the total man-days lost per year due to industrial accidents at 227,000,000, or the equivalent of over 700,000 man years.[11] These figures do not include the even greater losses due to automobile accidents—a terrible social waste, but not primarily an industrial one—although many persons gainfully employed are doubtless killed and injured by motor cars.

In accidents as well as in the following classification of sickness, we find not only an economic loss in labor time, but a bitter human waste in needless pain, misery and death.

Preventable Sickness

The United States Commission on Industrial Relations in 1915 estimated that 30,000,000 industrial workers in the United States averaged 9 days of sickness per year—or 3 per cent of their total time. Florence, after an exhaustive study of all the available data, American and European, on industrial ill health, concludes that men, on the average are sick 6.75 days in each year, and women 8 days. On the basis of a total working population of 42,000,000 to-day, at least 300,000,000 man-and-woman-days are lost by virtue of sickness, or the equivalent of one million workers always idle. How much of this is preventable?

Estimates are more rare here than in the case of accidents, and show a lower margin of possible prevention, when made. The Federated Engineering Societies estimates a net loss of one billion dollars per year, *i.e.*, what could be saved in time, less the cost of medical prevention. A billion dollars is roughly equal to the labor power of upwards of 500,000 men (dividing by $2,000). Thus, on the basis of one million workers always sick, at least 50 per cent of them, or 500,000, could be released for service by preventive medicine—after making due allowance for the cost of such prevention. Professor Irving Fisher has estimated that 40 per cent of all sickness is readily preventable by periodic medical examination and improved precautions against occupational diseases—tuberculosis, lead poisoning and others.

Not without grim significance are these figures of the death rate, not including deaths from accidents, by occupations in England in 1900.[7]

Farmers and clergymen	56.0
Metal workers	98.4
Textile workers	102.5
Transport workers	107.3
General laborers	211.6

Metal, textile and transport workers with nearly twice the liability to death of farmers and clergymen, and general laborers with nearly four times!

The Idle Rich and the Hobo

Economic students have amused themselves from time to time by drawing the parallel between the psychology of the leisured class at the top and at the bottom of the social scale. J. A. Hobson has handled the theme in *Work and Wealth* perhaps as delicately as any: "When we dip below the bourgeois and the regular working classes, we

find a lower leisure class whose valuations and ways of living form a most instructive parody of the upper leisure class. Both in country and town life these types appear. They include 'gypsies,' tramps, poachers and other vagabonds who have never been enlisted in the army of industry. Alike in country and town, these men practice, so far as circumstances allow, the same habits and exhibit the same character as the leisure class at the top. The fighting, sporting, roving, generous, reckless, wasteful traits are all discernible, the same unaffected contempt for the worker, the same class camaraderie, often with a special code of honor, the same sex license and joviality of manners. Even their intelligence and humor, their very modes of speech, are the half-imitative, half-original replica of high life as it shows in the race course, in the club smoke room, or the flash music hall. . . . Their withdrawal from all industry, coupled with the debased mode of consumption which they practice, count heavily in the aggregate of social waste."

There is not much statistical evidence to countenance the rather common impression that America supports a large plutocracy. The plutocracy is with us, but its numbers are not as great as popularly supposed. The income figures of the National Bureau of Economic Research for the last available year, 1918, show the following.[12]

Income Range	*Number of Income Receivers*
$10,000 to $25,000	192,000
25,000 to 50,000	41,000
Over $50,000	21,000
Total over $10,000	254,000

Thus there were only 254,000 persons out of over 20,000,000 families in the country, reporting income of over $10,000 a year in 1918. The number may be some-

what greater today, though probably not appreciably greater, for 1918 was a year of war profits. A more rigid examination of true income as against reported income might add some thousands to the list. But it is doubtful if there are over 300,000 families in the $10,000 a year, or better, class. What does this mean in the way of able-bodied adult idlers? A large number of women with nothing to do but spend, and dispense charity; and a relatively small number of men. In America it is not good form for a man—even a very rich man—to do nothing. This tradition at least survives from a hardier time. While the gainful activities of some of our rich men may be open to question from the point of view of the social value involved, that aspect comes more under the head of illth than of idleness. They are working, most of them, at something or other. We suspect that one idle able-bodied adult to a family would be a generous proportion, and that lost labor power by virtue of the parasitic rich does not exceed 300,000, of which the large majority are women. Thus while the raids which the very rich make on purchasing power, their actual consumption of super-luxuries, and the standard of conspicuous consumption which they set for the balance of the population, tend, in the aggregate, to create an immense volume of waste, the class which sets the pace is relatively small, and its percentage of idle members is smaller still.

Meanwhile Nils Anderson, head of the Juvenile Court in Chicago, estimates the total regular army of tramps, migratory workers and casual laborers, at 2,000.000.[13] Of this number, he believes the real hoboes—those to whom work is an unmixed evil—constitute about 30 per cent—or 600,000. Deducting 600,000 from 2,000,000 we get 1,400,000 as the total of the true casual laborer—which checks pretty closely with our figure of "over a million"

in the class of residual unemployment (page 131). This 600,000 is composed largely of men, great numbers of whom, of course, have passed out of the "able-bodied" class. If Mr. Anderson is to be relied upon, shall we say the loss of man-power by virtue of the hobo class is probably over 300,000 and less than 500,000?

Taken together, the loss from the idle rich and the gentlemen of the road may reach 600,000—hardly more. Identity appears not only in their philosophy of life, but in their numbers as well.

Child Labor

At first glance it appears that the million or more children under 15 employed in industry would act as an offset to our mounting total of idle labor-power. The functional society, even as many states have already done, would abolish child labor and we should lose just so much production in consequence. But should we? Here is what Mr. Hoover has to say in a categorical summary of sources of waste in human effort: "The use of child labor retards the proper development and education of about 300,000 children. There is a great economic waste involved in a population which includes debilitated, illiterate and untrained men and women, in addition to the moral and social issues involved." [14]

The census of 1920 gives the following figures covering child labor between the ages of 10 and 15 years:

In agriculture	610,000
In manufacturing	180,000
In trade and clerical	80,000
In domestic and personal	54,000
In mining	7,000
In miscellaneous	160,000
Total	1,091,000

Mr. Hoover's 300,000 was evidently based on the manufacturing, trade, clerical, domestic, and mining groups. In agriculture, the work of children between 10 and 15 years of age, may or may not be a bad thing. The Census also records a large number of children under 10 in street trading, domestic service and industrial home work—paper flower making, garment sweating, and so forth. Such employment can only be regarded as altogether an abominable thing.

By and large the functional society would gain more than it would lose by banning all wage labor for children under 15—or even under 18—and so this category, instead of being an offset to the waste of idleness, turns out to be a boomerang.

A Summary

Let us summarize the conclusions of each section in this chapter, giving such quantitative estimates as seem to have some reasonable basis in fact:

	Average Number Always Idle
Intermittent unemployment	Unknown total. Possibly from 5 to 10% of payroll. Estimated preventable 400,000 man years.
Seasonal unemployment	Unknown total. Runs at least 30% for soft coal, building trades, clothing trades. Over 2,000,000 man years can be identified in these trades alone.
Cyclical unemployment	Varies from 0 in boom periods to upwards of 5,000,000 in panic years. Constant average about 300,000.
Residual unemployment	Upwards of 1,000,000. A duplication, however, and not to be included in grand total.
Turnover, lost time	Unknown total. On the basis of 100% turnover for 30,000,000 workers at two weeks lost time, per turn, the aggregate reaches 1,200,000 always idle.

Strikes and lockouts	180,000 to 200,000 always idle on the average.
Absenteeism	Unknown total. Probably at least 1% of total payroll—say 200,000 on any given working day.
Preventable accidents	At least 500,000
Preventable sickness	Probably 500,000
Idle rich and hoboes	Probably 600,000
Child labor, (offset)	0

Would we be far wrong in estimating nearly 6,000,000 workers as a minimum, idle on any given working day by virtue of causes which a functional society would be at pains to eliminate?

Again we repeat that this idleness is largely involuntary. If the idle rich, the hobo, and straight absenteeism are placed in the voluntary class, these four items account for not over 800,000 out of the 6,000,000. Upwards of 85 per cent of all idleness is thus probably enforced rather than deliberate. A society which could make jobs last the year around—particularly if an element of interest in work could be added—would find, we suspect, nothing but enthusiastic support on the part of the great majority of men and women who are now broken under the wheel of unemployment, labor turnover, strikes and the needless agony of industrial accident and disease.

CHAPTER IX

WASTES IN PRODUCTION

Man-power losses due to bad technical methods in production and distribution constitute the third main channel in our outline of waste. Granting that the producers of illth gave up their jobs and returned to useful occupations, granting that the idle could go back to work, what wastes of man-power would still remain to be catalogued? Obviously the cases where two steps were taken when one was sufficient, where three men were employed to do the work of two, where current industrial practice did not live up to the progress of the technical arts.

This is dangerous ground to deal with at all, and impossible ground upon which to be dogmatic. The technical arts are changing so rapidly that it would involve a ruinous capital outlay to try and keep the whole industrial structure on a par with them from day to day. The most successful early automobiles were gasoline fired steam cars. Suppose such had been adopted as the standard of excellence, and the capital outlays of the automobile industry directed solely to the turning out of steam cars. When the superiority of the internal combustion gasoline engine had been demonstrated, all the steam car plants would have to be scrapped, and the whole industry given over to the new type. Far better the minor losses and plant scrappings of an industrial free-for-all, than an attempt to rehabilitate the entire national plant in line with every new invention. On the other hand, when a technique has long been subject to trial and error; when a superior.way

of doing the work has been demonstrated through years of experience—say in coal mining, lumbering, shoemaking, textiles—and when it appears that an appreciably large fraction of the industry fails to take advantage of these demonstrated methods, and shuffles along in its own rut in its own way—then, it seems to us, as it seems to the Federated American Engineering Societies, a true element of waste arises. In such a case more men are concerned with the job than the job requires, or the same number of men properly organized, could increase the output.

That is one aspect of it. It might be called the Scientific Management aspect. It is concerned with bringing the output per man day of the poorer plants up to a level with the better plants. There is another aspect, however, which, to our minds, is an even more important one. Waste arises not only because individual plants are badly managed, but because there is little co-ordination between the requirements of the population to be served by the output of these plants, and their production schedules. No manufacturer is sure whether his mill is going to run full time for the coming year, or half time, or shut down altogether. Requirements are not accurately known, and even when calculated roughly by statistical bureaus, no attempt is made to apportion them among the various units, so that each plant may run on an even, "balanced load" basis with the consequent saving in overhead, and economy of operation which such a program entails.

As Dr. Mitchell has pointed out, there may be great efficiency in individual concerns, but the operation of the whole industrial structure is uncontrolled, willful, chaotic and wasteful. It runs without chart or compass, and the only steersman is blind fate. In some of the greater monopolies—notably steel, oil refining and meat packing—an attempt is made to balance production against predicted requirements, but the difficulties are two. In the first place,

such a program, being unco-ordinated with the industrial structure as a whole, is liable to be thrown out of gear by the remorseless juggernaut of the business cycle which affects steel rails as well as silks and satin. In the second place, the program is usually directed not to that volume of production which comes nearest to meeting the wants of the underlying population, but to that volume which will yield the maximum return in terms of price. The highest monopoly profits are often made by severely restricting output *below* national requirements.

Now in the war, all this was beginning to change. A functional control was being inaugurated. It calculated requirements for a large fraction of national needs, and attempted to adapt production to them. So great was its success that it increased the output of physical products per man employed by some 20 to 30 per cent. The war boards did control, nationally; they co-ordinated coal with steel, with munitions, with textiles; they did not think primarily in terms of profit and prices, but in terms of tons required as against tonnage capacity. If such control is conceded as ultimately workable in peace time, and its procedure laid like a yardstick across the present industrial wilderness, a very great margin of waste must inevitably come to light.

We have then two problems of waste in production: The losses exposed by critical review—particularly by Scientific Management—*within* the boundaries of business-as-usual; and the further losses exposed by comparison with a functional control—such as the war initiated. The former is the more "practical" aspect of wastes in production, the second the more speculative, but probably in the long run the more important.

The balance of this chapter will be devoted to the practical problem. In the next chapter we shall permit ourselves some facts and some speculations from the stand-

point of national co-ordination. Both chapters will deal primarily with the productive process. Wastes in the technique of distribution—still a part of this third main channel—will be discussed in Chapter XI.

Scientific management

The going structure has been under fire—particularly and specifically—ever since Mr. Frederick W. Taylor began his studies in the art of cutting metals in the Midvale Steel Company a generation ago. What Taylor did was to apply scientific methodology—as opposed to guesswork—to the job of making up a given amount of raw material into a given finished product. To accomplish this end it became necessary to analyze every factor in the chain, to bring to bear the last work of technical knowledge, and ultimately to set up performance standards. If the job was making locomotive tires, the raw steel, the cutting tools, the arrangement of cutting machinery, the belting, the power load, the lubricating and cooling devices, the handling of supplies, and the physical motions of the men who ran the tools, had all to be analyzed and co-ordinated by hundreds of laboratory experiments until the best way was found. *Not a better way but the best.* In his high speed steel work, Taylor conducted no less than 40,000 experiments. The basic principles of his method were:

1. The development of a science or methodology for each element of a man's work, to replace the old rule-of-thumb practice.
2. The selection and training of workmen to follow the science laid down.
3. The paying of extra high wages to workmen who approached the standard performance set up.
4. The dividing of responsibility between men and management on the basis of scientifically determined function.

Taylor's work was a bombshell in the industrial world. The "practical" business men raged and stormed, called him theorist, visionary and crank. But the engineers—who ran the works for the business men—began to listen. By 1911, the outside public began to listen. When Brandeis charged the railroads with wasting a million dollars a day—a charge based on a Taylor analysis—the whole country began to listen. Scientific Management became a national watchword. "Industrial engineers" began opening offices right and left. The quacks, as in the case of every new discovery, descended in hordes and succeeded, as usual, in discounting a good part of the value of the movement. Meanwhile the technique locked horns with organized labor. In many cases the "extra high wages" to be paid for approaching performance standards, turned out to be a carrot in front of the donkey's nose. The whole value of waste elimination was pocketed by the employer, leaving the worker no share beyond an increased deposit of fatigue poisons. There were many cases of unwarranted speeding up.

But despite its mistakes, blunders, and a most unholy crew of camp followers, Scientific Management has opened the eyes of the world in general, and the industrialist in particular, to the waste and leakage of business-as-usual. Hundreds of surveys have been made in scores of industries with a view to locating preventable loss. A whole new engineering school has arisen whose chief job is waste elimination. Mr. Hoover and the Federated American Engineering Societies in their *Waste in Industry,* have given us the first authoritative book on industrial loss as a wide social phenomenon. Meanwhile the Simplified Practice Division of the United States Department of Commerce, and the American Engineering Standards Committee, with the co-operation of the industries themselves,

and technical associations, are analyzing the excessive diversity of types, styles, sizes, qualities, parts and designs of materials and finished products. The man who learned in the Midvale Steel Plant, that "the best measure of the value of a tool lay in the cutting speed at which it was completely ruined at the end of a few minutes"—has launched a movement which grows and ramifies. From its researches come many of the data in these chapters.

It goes without saying that the bulk of the work in this field has necessarily been financed and carried on with an eye single to increasing profits through lowering production costs. The benefits to the consumer by virtue of more moderate prices, increased production, or a higher standard of living have been hinted at, but only in passing, and only upon strictly theoretical grounds. Furthermore, wastes in consumption do not enter into the calculations at all, for Scientific Management is as applicable to a patent medicine factory as to a rolling mill. "The essence of business success is not to make good goods. It is not to have a host of employees. It is to have something left. The biggest word in the language of business is not gross, but net. To increase the net profits—that is the one aim of the Efficiency Movement. Decreasing net profit is to a company what pain is to a human body. It is a symptom of injury or disease." [1]

The Federated American Engineering Societies as a result of their analysis of six industries, set forth the following 14 points as the main sources of technical waste: [2]

1. Faulty material control—workers sitting around waiting for materials.
2. Faulty design control—lack of standardization of equipment and products.
3. Lack of production control—bad scheduling of work through the factory.

4. Lack of cost control—absence of cost accounting.
5. Lack of research—the present scarcity of technical research departments in factories; lack of statistical information on markets and demand.
6. Faulty labor supply control—lack of personnel departments and consequent high labor turnover; excessive hiring and firing.
7. Ineffective workmanship—lack of vocational training, resulting in high spoilage factor.
8. Unemployment—cyclical, seasonal; including strikes and lockouts.
9. Idle material—deterioration and obsolescence of excess stocks.
10. Idle plant—failure to use plant and machinery to capacity, on balanced load basis.
11. Restriction of output by management.
12. Restriction of output by labor.
13. Preventable sickness.
14. Preventable accidents.

Some of these points we have already examined in the last chapter, but the bulk of them are new. In carrying on the above study, the engineers set up performance standards for the six industries reviewed. Each plant was given a percentage grading based on the standard. Thus the variation was found between the best plant and the worst in each industry, and the ratio between the best plant and the average plant.

	Performance of Best Plant	*Performance of Average Plant*
1. Building industry	1.5	1
2. Textile industry	1.5	1
3. Men's clothing industry	2	1
4. Printing industry	2	1
5. Boot and shoe industry	3	1
6. Metal trades	4.5	1

These figures give us an idea of the manner in which average industrial performance falls below the level of the

best. If all the metal factories could be run as efficiently as the best metal factory studied, the industry would improve its performance from 1 to 4.5, or by 350 per cent. If all the textile mills could be run as well as the best textile mill studied, the textile industry would improve from 1 to 1.50, or 50 per cent; the boot and shoe industry, on the same basis, would improve its performance 200 per cent.

A Chicago brick machine makes 49,000 bricks per hour. According to Ethelbert Stewart, if all plants were as efficient as the best brickyards in Chicago, the industry could release 80 per cent of its employes to other productive work—or if it kept all its men, make five times as many bricks.[3] If agriculture throughout the United States was as efficient as it is in the State of Illinois—taken as a unit—Mr. Stewart claims that 4,619,000 workers could be released to other pursuits, and we would still secure the same agricultural output. There are boot and shoe factories where the output is two pairs per man per day, and others where it is 12 pairs. There are blast furnaces where it takes one man 1 hour and 12 minutes to produce a ton of iron, and other blast furnaces where it takes one man 11 hours to produce a ton—nearly ten times as long. There are sawmills where the output is 15 board feet per man hour, and others where it is 323. If all sawmills were as efficient as the *average* (not the best) mill, one-half the present man-power could produce the present output. If all sawmills could operate on a 323 board feet per hour basis, 45,000 men could do the work which now takes the labor of 292,000 men.

Figures like the above cannot, of course, be taken at their face value. Circumstances are too diverse, unique difficulties are too many, to expect industry generally to breast the performance of its best units. All such figures

can show is a tendency, and an indication of where to look for waste in the technique of production.

Scientific Management does not necessarily concern itself solely with the performance of individual plants. It may review a whole industry—such as the railroads, or the metal trades. It may invade the home and time-study the labor of washing dishes. It may, as in the case of President Taft's Commission of Economy and Efficiency, attempt the detection of waste in government service, including an assault upon clerical red tape. It may study marketing and distribution methods, counting the number of half-loaded milk wagons to the block. It is a universal technique, and anybody's to use who has the intelligence and the perseverance to apply it to his own problem. Its greatest effectiveness, however, has lain so far in what might be termed "plant control," and in the allied movement which has grown out of such control—Standardization and Simplification. Taylor's work led directly and inevitably into standardization, but the movement as such did not require capital letters until about the time of Taylor's death. Scientific Management and Standardization are thus part and parcel of the same industrial technique. In the following sections, we shall consider first the wastes which Scientific Management has unearthed in the general field of plant control, and then attempt a rough summary of the Standardization movement.

Plant Control

Time-study work, motion-study work, the setting of production standards, inventory control, the flow of raw materials through the plant, the proper adjustment of belting and the power load, the most efficient type of machine. cost accounting control, research, both as to production processes, and market outlets—all come under this gen-

eral heading of plant control. Idle plant, unemployment, turnover losses, are also, of course, a part of the efficiency engineer's problem, but these we have segregated elsewhere. Our immediate concern is with shop methods and shop management.

Mr. Fred J. Miller notes that plant wastes arise because of overloaded inventories; because of slow movement of materials through successive operations of manufacture; unskilled handling and treatment of materials; lack of measures for placing responsibility for delays; failure to clearly distinguish between those things which are the workers' responsibility, the foreman's responsibility, the superintendent's responsibility, and the owner's responsibility.[4]

In respect to the responsibility for waste, the Federated American Engineering Societies conclude, as a result of their studies, that the chief burden falls on management as follows:[2]

Industry	*Waste due to Management*	*Waste due to Labor*	*Waste Due to Outside Causes*	*Total Responsibility*
Building trades	65%	21%	14%	100%
Boot and shoe	73	11	16	100
Metal trades	81	9	10	100
Printing	63	28	9	100
Men's clothing	75	16	9	100
Textiles	50	10	40	100

While these percentages (although prepared with immense statistical decorum) make us wonder how it is humanly possible to come to any such definite figure when dealing with a problem that is half psychological, they tend at least to show that American managers have much to learn about running their own plants. Let us review briefly the conclusions of the Federated American Engineering Societies in respect to these six industries.

The building trades

In the building trades it was found that $600 could be saved in the cost of erecting the average house by standardizing wall designs. The examining engineers found that duplications in estimates and bidding run into the millions each year; that "in scaffolding the waste of lumber is appalling"; that one man in the course of five and one-half years worked for 76 different contractors and was hired 108 times; that the detail of a cement shed studied "was such as to require three times as many men as should have been needed to handle and empty the cement"; that there are 4,000 small contractors in Cleveland, while not 400 are needed to do the building work; that cost-plus contracts make for unbelievable waste; that "bad planning, control, and lack of standards often double the labor costs"; that, in short, bad management is the rule in the building industry.

Boots and shoes

In the boot and shoe industry, the engineers found admirable machines for making shoes, combined with poor production methods and poor management. From 25 to 35 per cent of all the time worked in the shoe plants studied is lost through departmental congestions and bad routing of raw materials through the shop. *Here we have, not unemployment on the streets, but unemployment on the job—workers sitting around a third of their time waiting for materials to come along.* On the basis of 250,000 workers in the industry, this is the equivalent of the lost labor power of 75,000 operatives. The too frequent style changes in women's shoes are partly responsible, of course, for this internal jam. Styles tend to prevent managers from planning production in advance. But even in plants where planning is possible—such as those manufacturing

men's welt shoes—the engineers found it took 8 days for a pair to go through Factory A, and 23 days to go through Factory B—making the management of B nearly three times as inefficient as A. They found that speculating in leather was an evil thing for the industry. They found that a bad leather cutter will waste $100 worth of leather a week as against a good cutter. Yet one is not born a good cutter of leather, it is a technical art which a competent management can teach its men. They found that 25 per cent of all shoes were damaged in the making. A sound system of inspection could eliminate much of this waste. They calculate the total annual loss due to the single factor of bad routing of work in shoe factories, at $65,000,000. By eliminating the *three* single factors of seasonal fluctuations in shoe manufacture, internal plant congestion, and excessive spoilage of leather—they figure that a saving of 21 per cent could be made in the selling price of shoes—that we might have $10 shoes for $7.90.

The metal trades

In the metal trades industry—including the manufacture of steel plates, shapes, castings, piping, machine tools, motors, trucks, tractors, engines, locomotives, cars, electrical equipment, steel ship building, firearms—the normal annual waste is estimated at half a billion dollars a year—roughly the equivalent of the labor of 250,000 men. In the plants studied, the best plant showed a margin of 6 per cent of preventable waste, the worst 56 per cent, while the average for all plants was 28 per cent. Note the word preventable. Planning methods—particularly personnel planning—are bad. One plant which put in a modern shop scheduling plan, increased its output per man—by weight —121 per cent in a year. Labor turnover averaged 160 per cent in the plants studied—one factory running as high

as 366 per cent. Meanwhile it costs from $50 to $250 to break in every new man hired. There are very few cost accounting systems in the industry. The general policy of the management is to sell the goods first and make them afterwards. This, as in the case of the shoe industry, throws internal routing out of gear, and makes for great irregularity in output. The average metal plant is about 30 per cent behind the best plants in output per employee. There is great need for standardization of equipment.

The printing trades

In the printing industry the Hoover engineers found only two plants with production standards for routing their work. In New York City, 56 plants had cost systems, 187 plants had no cost systems, but had a general knowledge of total costs, 554 plants had no cost system and no general knowledge of their total costs. There are 600 types of folding machines while 6 types fulfill the industry's every requirement. Special machines are bought for special jobs, then scrapped. One printer bought a trading stamp machine for $17,000, and then lost the job! This trading stamp contract has since gone to three different printers, and each in turn has bought a special machine for the work—four $17,000 machines, where one would suffice—granting any utility whatsoever in trading stamps! All printing is ordered in thousands, but the old ream and quire count is still used in the shop. There are 6,000 brands of paper, 50 per cent of which are quite inactive, but have to be kept in stock. Meanwhile the Federal Reserve bank checks will not cut without waste, from any regular paper size! There is only one apprentice for every ten journeymen printers—a condition which the engineers well term "industrial suicide."

Men's clothing

In their examination of the men's clothing industry, the engineers estimate that:

9 hours of every week are wasted by virtue of seasonal fluctuations.
10 hours are wasted through bad shop methods.
3 hours are wasted because of unnecessary work performed.

Thus about half the working week comes to nothing. The total waste in the industry is set at $750,000 a day, or about $225,000,000 a year. This is the equivalent of over 100,000 workers. The ratio of waste is placed at 40 per cent.

The "sell the goods before you make them" policy is prevalent, and, as in the case of the metal industry, is disastrous to internal shop efficiency. It forces manufacture in small lots, and a high factor of seasonal production. One concern making 400,000 suits a year averaged only twelve garments per lot. Small lots mean constant interruption in work and a high cost per garment. They make production standards and advance planning so expensive as to be dispensed with! As a result, the workers sit around waiting for the work to drift through. Many of the detail processes cost no more for a run of 500 suits than for a run of 3 suits. Despite all this preparation for small lots, and the resulting high cost, from 70 to 80 per cent of all suits sold concentrate on "regular" forms in five sizes. If the industry had foresight enough to study its records of actual sales, it could concentrate on these comparatively few sizes and styles, and plan in advance for large lot production on a balanced load basis. Some garment shops are already beginning to realize this. The engineers found a lack of standardization in machines, in ma-

chine maintenance, in machine operation, in cutting, sewing, pressing. Twenty per cent of all internal operations are analyzed as unnecessary. There is much speculation in cloth, and relations with textile mills are generally bad. The manufacturers chronically oversell the retail dealers, whereupon the dealers cancel orders and return goods—making a bad matter worse. Cancellations run up to 33 per cent, returns up to 18 per cent of all business done.

In the textile indusry, the Hoover engineers found a ratio of waste which averaged 51 per cent in the plants studied.

Mr. Hoover and the American Federated Engineering Societies in *Waste in Industry* have thus established beyond peradventure the very high margin of loss and leakage which normally obtains in these six industries. Furthermore we have been informed on good authority that the six were not selected because they represented the dregs of American industrial performance, but if anything the reverse. In coal or lumber or oil, as we shall see, the count would be still heavier. So far as summary figures are given, they appear as follows:

	Ratio of Waste	*Waste in Money*	*Estimated Waste of Man-power*
The building trades..........	not stated	not stated	......
Boots and shoes..............	(1) 21%	not stated	(3) 75,000
The metal trades............	28%	$500,000,000	(4) 250,000
The printing trades..........	not stated	not stated	......
Men's clothing	40%	225,000,000	(4) 112,500
Textiles	(2) 51%	not stated	(5) 500,000

(1) For 3 factors only.
(2) For plants studied.
(3) Equivalent of idle time in factory.
(4) Dividing waste in money by $2,000.
(5) Applying a ratio of 50% waste to the 1,000,000 textile workers.

Machines vs. men

Ethelbert Stewart of the Department of Labor sees as one of the principal items of production waste, the failure of American industry generally to substitute machine power for man-power.[3] Because foreign labor was cheap, and required no upkeep in the form of interest, insurance, taxes and depreciation—(it could be fired at will, and if it was damaged in the shop, it could bear the whole cost itself)—manufacturers have let the Wop and the Hunkie wear out their lives doing what a machine would do quicker and better, and, from the social point of view, cheaper. "Most of the successful attempts to stop the wastage of men have been accomplished by simple readjustment of machines or by means of automatic conveyor devices, or by the installation of more efficient trucking and shop transportation methods. One automobile factory where the raw material travelled 3.5 miles before it became finished product, now travels but 50 feet, due to such readjustments. By means of a shop transportation device in a Louisiana plant, 4 men are now doing, in a few hours each day, the amount of work it used to take 100 men 12 hours to complete."

Cost systems and research

The Federal Trade Commission reports that out of 250,000 manufacturers in the United States, only 12,000—about 5 per cent—have cost systems of any kind. A cost system is a device for telling how much a given product—a book, a steel rail, an automobile, a pencil—actually costs to make. It is invaluable for setting fair selling prices, but its chief virtue from our man-power viewpoint, is the information it gives executives as to how to plan their work in order to secure a maximum output with a minimum of effort. It shows the number of man hours, or machine

hours involved on each job, it shows the wastage and spoilage of material, it discovers where leaks and losses enter. A good cost system is a sign of good internal management, the absence of a cost system, a figgerin', 'calating, guessing, management—in brief, in plants where cost finding is already demonstrably practicable—a wasteful management.

Research work is also largely neglected at the present time by the general run of manufacturers. They have no specific department devoted to analyzing their product, and to keeping up with new invention and technology. They do little research in connection with their markets. A good internal research department is probably better than all the "efficiency engineers" ever heard of. The latter come in, nose around—often in a new territory for them—point out a thing or two, and depart, leaving a whale of a bill behind them. The research department, on the other hand, is on the job every day, knowing the business and its problems more intimately than any outsider can hope to. It can hold the production of "seconds" to reasonable limits, and raise the whole quality of the output; it can compute the most efficient power load for the plant; it can install automatic measuring devices for many plant processes and so bring them out of the area of rule-of-thumb, and into the area of control.

The General Electric Company gives an example of what research can do in the line of improving product and lowering cost.[5] The tungsten filament—Mazda—lamp was worked out in its research department. Had the old carbon filament lamps been used exclusively in the United States, it is estimated that, for the year 1920, consumers would have had to pay *one billion dollars more in electrical current to secure an equal amount of light* (gross candle-power equivalent). In contrast with the General Electric, the canning

industry is furnished by and large, with up-to-date equipment, and up-to-date sales policies, but the actual preparation of the foods themselves is given over to men without scientific training. Laboratories, chemists, and bacteriologists would improve the internal management, and greatly improve the quality of the canned foodstuffs which we all have to eat. Again bacteriologists in the sugar industry could, according to C. E. Coates, save the present great loss through excessive fermentation, while chemists could tell the industry how to utilize its by-products.

Hours and efficiency

Finally we have to note the peculiar factor of hours worked in a day. The more hours, the more output—of course! As plain as the nose on your face! But as a matter of scientific fact, the more hours, over a certain maximum the *less* output. "So far as the evidence goes, the effects of reducing hours of work may be summed up as follows: Reduction from a 12-hour to a 10-hour basis, results in *increased* daily output; further reduction to an 8-hour basis results in at least maintaining this increased daily output; further reduction below 8 hours, while increasing the *hourly rate* of output, seems to decrease the total daily output." [6]

Thus a greater output (by weight) is secured from men working 8 hours a day than from men working 12 hours a day. It follows that the 12-hour day is a wasteful day—quite apart from the human factor involved. It wastes man-power by requiring more men to do a given job, than the job requires. And, of course, it wastes man-power by reason of fatigue, accidents, sickness and shortened life. (The peak of industrial accidents always comes at the end of the working day, when men are tired and careless.) The count against plant management on this

score is not as bad as it used to be, but hundreds of thousands in the country are still working over 10 hours a day.

Industrial physiology and psychology

In Barcelona, management engineers recently carried out an investigation which showed that of 500 apprentices, only 47 per cent chose their work because they were interested in it or had talent for doing it. The other 53 per cent had just drifted in, influenced by imitation, family connections, the hope of money to be made. The 47 per cent group proved, under analysis, to be by far the most competent.[7] They were round pegs for round holes, while the others were square. Perhaps this sort of investigation is destined to constitute the greatest contribution of Scientific Management to the problem of waste elimination. Consider the incalculable social saving in "abolishing the huge number of occupational misfits and thus reducing not only the vast expense of a needlessly large labor turnover, but also the overstrain and unhappiness of the worker who has drifted into the wrong occupation." Taylor pointed out that while we were becoming aware of the enormous wastes of our material resources we were still ignorant of the even greater wastes due to the misdirected energy of human beings in respect to their daily tasks.

Strangely enough, Taylor in his technical practice seems to have often thwarted and frustrated a balanced psychological release of human energy—but he at least grasped the essential problem. His followers today are doing better. Their time-studies take account not only of economy in physical motion, but economy in psychic satisfaction. The problem of adapting the biological mechanism to the industrial process is still in its infancy. Granting the

assumption of the modern world that only by virtue of the machine process may human wants be satisfied, it follows that the more inner satisfaction which the worker can get out of his job, the better the job will be done. Two sources of waste will be checked; that which flows from unnecessarily low output per unit of energy; that which flows from sickness, industrial neuroses, psychological frustration.

The employer, old style, has been densely ignorant of all such considerations. To expect the worker to get satisfaction out of his job bordered on the immoral. Of course, he had to be driven if the work of the world was to be done at all. And a bitter toll of human agony has been taken in a century of driving. Meanwhile the recent researches of management engineers—as evidenced in the case of long hours of work already cited—makes it clear that not only has the worker paid a terrible price for this policy, but the employer himself has lost output, lost shop morale, lost sales, lost profits.

A few illustrations of the new approach taken from Mr. H. D. Harrison may not be out of order.[7]

1. By a series of tests—involving sight, hearing, clarity of speech, memory for numbers and for order of instructions—occupying about two hours, it has been possible to determine the comparative ability of applicants for the position of telephone operator as accurately as by a six months' course of training, and with far less expense. Meanwhile the applicant who is rejected is spared the waste of time and the discouragement which would follow dismissal at the end of six months.

2. Munsterberg worked out a test for street car motormen which, in ten minutes' time, divided those applicants who were fitted for the job from those who were not. In this case not only do the worker and the company save

time and energy, but the public is protected through the avoidance of future accidents.

3. Girls employed on a monotonous process in a bleaching works were given under the prevailing method two rest periods of 45 minutes and a midday break of 45 minutes. On the advice of Mr. Gantt (a Taylor disciple) this was changed to a 20-minute rest after every 80 minutes of work. As a result there was a 60 per cent increase in output. The more frequent rest periods gave a better energy balance.

4. "A foreman bricklayer is at work on a bungalow just in front of my window as I write. He is laying bricks on a wall which is now some 6 feet high. His bricks are in a loose heap at his feet and his mortar board is on the ground near. Every time he needs a brick or some mortar he lowers his body, then raises it loaded through several feet, the nine-pound brick he raises through some 6 feet to the top of the wall. By introducing an adjustable scaffold, a table to take the mortar box, and the bricks so arranged that they could be taken up exactly in position for laying, and by a reduction in other movements involved, Gilbreth (another Taylor man) increased the number of bricks which a man could lay apparently without increased fatigue, from 120 to 350 an hour."

5. A very careful study was made of the process of packing chocolates. Each element was timed and examined, and it was found that much time was wasted in choosing between different chocolates and "endeavoring to overcome mental states of indecision by voluntary effort." This was largely due to the haphazard method of arranging the chocolates made necessary by the type of bench. A new type was introduced which rearranged the chocolates so that the work depended on the *rhythm of movement rather than on a series of voluntary decisions.* The aver-

age increase in output was 35.7 per cent. And it is safe to say the girls worked with less mental turmoil and consequent fatigue.

6. A repetitive process in a candy factory which averaged 2 seconds to make, was found to involve—during the 2 seconds—3 stoppages and 3 changes of direction on the part of the worker. By introducing a continuous curved movement instead of a discontinuous angular one, the time was reduced, and output increased by 27 per cent—although the actual line followed by the hand was slightly longer. With the human body, a straight line is not always the shortest distance between two points! Rhythm may mean more than brevity of motion. Failure to adapt work to the natural rhythmic resources of the body sets up serious psychological "interferences" with deleterious results on worker and on output. "The attainment of greater speed by eliminating all apparently unnecessary movements without regard to their physiological significance, might make the movement quicker as a single act, but cause a rapid development of fatigue."

7. In the case of typing, the New York Commission on Ventilation found that 63 per cent more could be done at a temperature of 68 degrees than at 75 degrees. In the case of heavy physical work 15 per cent more could be done at 68 degrees than at 75 degrees, and 37 per cent more than at 86 degrees. Meanwhile the average record of temperature in the workrooms examined was 73 degrees, while 29 per cent of the workrooms averaged over 80 degrees Fahrenheit. "The loss of efficiency must therefore have been enormous."

8. A 25 per cent increase in output resulted from the removal of certain workers to a quieter part of the factory. Strong rhythmic sounds—such as a powerful steam hammer gives—generate more fatigue poisons than continuous

noises. *"Where the rhythm is different from that of the work being performed a struggle ensues which causes the expenditure of nervous energy in excess of that required by the work itself."* What has the disregard of this one item alone cost industry in suffering and waste in all the factories of Western civilization since the industrial revolution? And what is it costing today?

In the above paragraphs we gain some realization of what Scientific Management is uncovering in respect to the physiological and psychological aspects of waste normally present in industry. And yet—and yet—the question still persists. Is it the task of functional society to take the machine as it stands and adapt man to it, or to take man first and adapt the machine to his nature and his needs?

Standardization and Simplification [8]

In the early 90's, electric lamp bases were made in over 180 different sizes and styles. Which meant that new lamps would not screw into old sockets, and that electric heaters, flatirons, stoves, curling tongs, bedpads, motor attachments of all kinds required in most instances the services of a skilled electrician before they could be made to work. Today, thanks to standardization, we have one common lamp base and socket which is interchangeable for all electrical attachments—though there is still much to be done in standardizing the implements at the other end of the chord.

In Paris a call on the telephone is said to be an adventure in a complex of silence and blasphemy. The Government runs the lines, but 25 private manufacturers are allowed to compete in providing subscribers with 150 different types of instruments. Some instruments are good, some are indifferent, some are bad; some have gone out of business and repair parts cannot be had. When anything goes wrong with the phone, the Government inspector blames

the instrument, and the instrument maker's inspector blames the Government. Courtesies and correspondence are exchanged indefinitely on this basis. Ultimately with a fair run of luck the trouble may be repaired.

In the United States we have at least standardized the lamp socket and telephone equipment. It has saved us untold waste. Unfortunately the underlying principle has not been widely applied to other industries, where the technique of the Paris telephone is still the rule. Progress is steadily recorded, but an immense amount of lost man-power remains. There are 102 sizes of men's shoes. It is estimated that the extra cost to the shoe business caused by odd sizes amounts to $100,000,000 a year. Ninety-one per cent of all stores entering the retail shoe business go bankrupt—more than half of them because of odd sizes. Shoe sizes are not standardized, one maker's number 10 may equal another maker's number 9. In 1920, the Regal Shoe Company had 2,500 styles of shoes which sold at an average of $10.46 per pair. In 1923, the company cut its styles to 100, with a standard selling price of $6.60. As a result it has doubled the number of shoes sold, while reducing its inventories 25 per cent, and reducing the number of store clerks. There are 34 sizes of wheat packages in use, yet 97 per cent of all shipments go in 5 sizes. There are 200 types of printing presses to do the work which 5 types could do equally well. A recent questionnaire to professional engineers prepared by the American Engineering Standards Committee revealed 1,000 outstanding opportunities for eliminating waste through standardization.

Meanwhile the Department of Commerce has *endorsed* the following reduction in styles (up to March, 1924), but the industries concerned are still far from having put all the reductions into actual effect.

	Number of Styles Actual	Proposed Simplification
Vitrified paving brick	66	5
Metal lath	125	24
Woven wire fencing	552	69
Woven wire fence packages	2,072	138
Asphalt penetrations	88	9
Roofing slate	60	30
Hollow tile	36	19
Rough face brick	39	1
Smooth face brick	36	1
Files and rasps	1,351	496
Range boilers	130	13
Beds, springs and mattresses	78	4
Bed blankets—sizes	78	12
Forged tools	665	351
Blackboard slate	90% elimination endorsed	
Bolts and nuts (plows)	40% " "	

Axes are made in 34 models in 4 qualities, 11 finishes, and from 5 to 19 sizes. One firm was actually listing in its catalogue 6,000 varieties of ordinary single-bit axes. There are about 35 different brands of axes; and thus the buyer is actually offered a range of choice between 994,840 varieties (multiplying models by qualities, by sizes)! Men's hat manufacturers offer 36,845 styles and colors—yet 90 per cent of the business is done on 7 styles in 10 colors. "It is from the enormous production costs entailed by this useless diversification that the great bill for waste comes in." One concern offers men's suits in 29 stock models and 14 special models, each in 3 styles of lining construction, 3 kinds of lining material, and 1,110 varieties of cloth. Thus every suit buyer has a free choice among 278,000 possible combinations. Yet 70 to 80 per cent of all sales of men's suits concentrate on "regular forms in 5 sizes." [2]

The United States Chamber of Commerce has recently conducted a spirited campaign in the interest of simplified

practice.[9] Its studies indicate that *fully 25 per cent of all effort in American factories is wasted because of needless variations in sizes, styles and models.* "From the nearly 45,000 characters of the Chinese literary script to the 26 letters of the English alphabet is an example of simplification about as complete and satisfactory as will be found in history, even if the final result does not touch perfection. For some more or less occult reason, human progress seems to sprout from the simplest forms; to develop through a multiplication of complications; and, finally to resolve itself into a prevailing, simpler, persistent type which may be regarded as nearly final. This has been the result in the alphabet, but in merchandise—not yet! Varieties, sizes and seasonal changes in merchandise still constitute a sky-piercing Tower of Babel. Its pinnacle is almost beyond the reach of vision, and its builders have not heard the word which will result in their confusion—exposing the waste, folly and futility of such a monument. We are embarrassed in selecting from the multitude of instances which offer themselves for illustration but we are not embarrassed in making the statement that the foundation of this structure forms the base upon which are erected enormous surcharges in the costs of distribution."

Does the Chamber of Commerce of the United States realize to the full the implications of such a statement? Perhaps if it did, it would have called a halt to its publicity man's flow of rhetoric. What has been the chief drive behind this "multiplication of complications" that so irritates the Chamber? Competition and advertising—both the life of trade, and if we may say so, the keystone of the arch of American business. Simplification would be the matter of course rule in a functional society—just as it was made the rule by the War Industries Board in 1918. To try and force it into an acquisitive society is a com-

mendable, but we suspect a limited, gesture. Where will the "talking points" of the salesman be; what will the advertisers have to beat their breasts about; how is Smith's plumbing to rise over the prostrate corpse of Jones' plumbing—if uniform industrial standards of quality, type, and interchangeability are set up?

Mr. F. J. Schlink, Assistant Secretary of the American Engineering Standards Committee, has mapped out the field of standardization as follows:

Kinds of standards

1. Units of length, mass, time, temperature, etc.
   Example: A gallon, a pound, a foot.
2. Standards of size and form
   Example: Standard screw threads, bolts, nuts, electric sockets, a car wheel, an invoice.
3. Standard ratings
   Example: A horse-power rating for electric motors, a speed rating for locomotives.
4. Standards of quality
   Example: Specifications for iron ore, paint pigment, cold rolled steel bars, fat content in milk.
5. Standards of practice
   Example: Construction specifications for erecting a steel bridge, safety code for grinding operations.
6. Standard nomenclature
   Example: For radio terms.

The philosophy of standardization

The word "standardization" is perhaps an unhappy one. It connotes in the lay reader's mind a dead level of uniformity, regimentation; an industrial goose step. It may of course be that. One could standardize hats and suits and houses and furniture to a depressing and horrible degree. Economic effort in great quantities could be saved thereby, but the price would obviously be too high a one

to pay. A nation of Universal Robots. An elimination of waste of such a nature would turn out to be a boomerang—almost too terrible to contemplate—and we have not the slightest intention of including it in our inventory.

There is another aspect of standardization which we do include. A better name for it might be "simplification," or "unification." Most of the examples already quoted come under this head. The bulk of Mr. Schlink's definition comes under this head. When a certain point in the technical arts is reached, the time comes to set up a standard practice for past experimentation, to make the job as automatic as possible, and so save freedom and energy for further exploration. A woman moves into a new house. For a month, all is confusion and hurry—furniture to be tried here and there, pictures to be hung and rehung, the procession of the children through the bathroom in the morning to be determined, pots and kettles to be placed, rugs to go down, curtains to go up, the infelicities of the furnace to be experimented with, a place for coats and hats. Is it claimed that human values are lost, and regimentation introduced, when this job is at last standardized? Ask any mother. And so with industry. Reducing styles to the number actually in demand, reducing processes to a minimum of lost motion—clears up the shop so that output may be increased at a lower unit cost; so that the management may have some peace of mind to go on to research and improvement.

In all the intermediary processes of industry there is room for great savings through simplified practice—in valves, screw thread sizes, piping, paper sizes, safety devices, fire apparatus, mining and loading equipment, railroad equipment, power, heat and ventilating equipment, building materials, concrete mixers, water tanks, boilers, generators, tool steel, jigs, dies, drills—endless things. All

of such processes have nothing whatever to do with the final consumer. It is only when we come to *end products*—like coats and neckties and six-room houses—that wholesale simplification must be modified by considerations of human taste and individuality. Mrs. Carleton Parker states the distinction admirably: "I can't see but what the nation as a whole could find no great psychological repression if everyone had to use all 21-inch sewer pipes instead of some 22-inch pipes, but I don't want all ladies wearing the same hats."

Standardization is not of course a lone element of waste that may be appraised by itself. It is linked with idle plant, with unemployment, with advertising, with business failures, with adulteration, with industrial co-ordination generally. The man-power wasted by failure of American industry to introduce simplified practices cannot be accurately calculated, and if it could, part of the total would obviously belong in other categories as well. In the automobile industry alone the American Engineering Standards Committee estimates a possible saving of $750,000,000 through standard practices.

Mr. W. A. Durgin, late Chief of the Division of Simplified Practice in the Department of Commerce, has estimated that $10,000,000,000 a year could be saved in the United States through industrial simplification. "The waste we are warning against comes entirely from over-diversification." Ten billions divided by $2,000 is the equivalent labor power of some 5,000,000 of workers. The United States Chamber of Commerce meanwhile estimates a waste of one-quarter the productive man-power. Eliminating farmers and the overhead trades from our total labor power of 40,000,000, it leaves about 20,000,000 against whom the estimate of the Chamber applies. One-quarter of 20,000,000 is 5,000,000, or approximately Mr.

Durgin's total. If we cut this figure in half due to duplications with estimates in other fields, it still leaves a wasted man-power due to standardization failures of 2,500,000.

The metric system

We cannot close this brief review of standardization without at least a word as to the potential saving through a wide adoption of the metric system. The American Metric Association has estimated that one year of school life for every American child could be saved if the decimal system of weights and measures replaced the pints and feet and acres and rods, the quires and reams, the bushels and pounds of the present immemorial usage. We confess it is with sorrow that we see a child enter upon this uncorrelated, illogical—almost mystical—desert of mathematics. And certainly, in later life, 50 per cent of all clerical labor dealing with weights and measures could be saved by the introduction of the metric system. The Metric Association puts the total loss at $800,000,000 a year, the equivalent of 400,000 man-power.

The above is, we fear, an inadequate review of waste within the going business structure as disclosed by the Scientific Management engineers. More of their findings will be quoted in the next chapter which deals with national co-ordination—findings primarily in the field of excess plant capacity. But perhaps enough is set forth to make it plain that a broad and comprehensive indictment against wastes in production has been registered by Frederick W. Taylor and his followers. A summary of this chapter will be found at the close of the next, where the major wastes in production are recapitulated.

CHAPTER X

INDUSTRIAL CO-ORDINATION

A perplexed manufacturer was sitting through a meeting of the Taylor Society in 1921. Efficiency, standardization, technical improvement were in the air. About him were gathered some of the most competent industrial engineers in the country. Finally he arose and said: "Why is it that although there has been improved machine after improved machine, although we have increased the productivity of the worker, the productivity of the plant, the productivity of the nation, the cost of living is constantly increasing? We do things so much better than they have ever been done before, yet it apparently costs more to do them that way, and the difference is not in the rise of wages. I believe it is the dissipation of energy through competition. These great varieties of styles to choose from do not reflect the wishes of the consumer, but the bright idea of some salesman to build up lagging sales. There must be more co-ordination between the department of sales and the department of manufacturing."

We can only agree with Mr. Leffingwell, the manufacturer turned philosopher. What are our 3,000,000,000 mechanical slaves doing that so little net good comes back to us? They are working hard producing, and, under the spur of competition, they are working even harder selling, but the two processes are not co-ordinated. In the resulting gulf, the labor of untold men and women, and of their mechanical slaves, is submerged and lost. Through failure to adapt production schedules to national requirements,

through the building of unneeded plants and the maintenance of those plants when built, through the dumping and destruction of finished products which cannot find a hungry dollar though there may be plenty of hungry mouths, through restriction of output by management and men, through bad community planning resulting in the congestion of cities and the loneliness of the countryside, through over-centralization of industry, through uneconomic location of industry, through commercial failures due to ignorance of supply and demand, through the hoarding of technical knowledge for private gain rather than its release for community use—waste takes its mighty toll.

These are matters concerned primarily with the technique of production—with the taking of two steps where one would suffice. But we cannot stop them from ramifying into other classifications as well. Lack of co-ordinated control leads to the long swing business cycle of booms and panics, and in many cases to the short swing seasonal cycle of rush months and dull months. It is thus bound up with the waste of idle man-power. It affects the whole technique of selling and is thus bound up with wastes in distribution. It is affected by advertising, by speculation, and is thus bound up with wastes in consumption. It is affected by plant management and standardization failures, and is thus bound up with the factors considered in the last chapter. The classification is not clean-cut, it cannot be. The facts set forth in this chapter accordingly are not a distinct and separate category of waste; they deal with production primarily, but they flow over into nearly every other field.

Co-ordination means planning for a given end. It means the traffic cop instead of a free-for-all. In the present case, it means the ascertaining of human requirements in bulk terms of food, shelter, clothing, and the adaptation of

the productive plant and the distributive system to meet them with a minimum of lost motion. The Council of National Defense worked on such a program during the war. It determined gross requirements in tons or cubic measure for the entire population, and against them measured the operating capacity of farms, factories, storage space, and transportation facilities. The Council found in 1919 that America came out of the war normally well provided with food, except for a few articles, but, following the Armistice, certain food crops declined below the level of normal requirements.[1] It found that for the first quarter of 1919, the production of boots and shoes, fell 75,000,000 pairs under the level of the last quarter of 1918. It found that stocks of woolen goods were unprecedentedly low—yet in February, 1919, 52 per cent of all woolen looms were idle. It found that with a shortage of a million dwelling houses, building operations were at a standstill. The Council had no power to act in the constructive sense—to carry out a program of industrial co-ordination; it simply took the first step by making a preliminary statistical survey—an aeroplane view if you will. During the war the Fuel Administration, the Food Administration and the rest, as we have seen, went beyond this preliminary stage, and actually co-ordinated production to requirements in those products—particularly munitions and fuel—which were essential to the winning of the war. But outside of the 1919 work of the Council of National Defense we know of no nation-wide attempt to co-ordinate industry on the basis of peace-time requirements.

From the point of view of the functional society, it is probable that failure to do so is responsible for the greatest man-power waste of all. Under the canons of business-as-usual, we are shooting blindly, without aim, without goal. We have no knowledge of the consumptive capacity

of the country, or even of its possible absorption of goods in terms of price. Each industry, each plant, is trying to sell all it can. Newcomers are continually breaking into an industry that already has sufficient plant to furnish double the consumptive requirements. When the price of soft coal runs up, scores of new "snowbird" mines are opened in the hope of quick profits. Meanwhile the mines already developed can produce, at full capacity, 50 per cent more coal in a year than the country has ever used.[2] One automobile tire concern has the plant facilities to supply the entire national demand.[3] Yet new concerns invade the tire business. On the other hand, as the Council of National Defense has pointed out, when the country is short a million homes, the building industry slows down and stops; and when it starts up again (in 1920) it goes into commercial structures—of which there is already an excess number—rather than into houses for people to live in.

The failure to co-ordinate production to requirements is illustrated by the following table:

INDEX NUMBERS OF PHYSICAL PRODUCTION IN THE UNITED STATES [4]
Compared with Population—1920 *taken as* 100

	1920	1921	1922	1923	1924
Population	100	101	104	106	107
Coal—tons	100	77	72	97	85
Petroleum—gallons	100	106	124	166	162
Pig iron—tons	100	45	73	109	104
Wheat—bushels	100	98	104	94	103
Corn—bushels	100	96	91	95	77
Cotton—bales	100	59	73	76	98
Sugar—pounds	100	150	115	124	141
Automobiles	100	76	121	181	163
Boots and shoes	100*	86	98	106	96

* 1919 used as base—Department of Commerce did not publish figures for 1920.

Population in the last analysis governs requirements. In a general way production should move with population. These figures show how production has very little correlation with population. While population moves steadily from 100 in 1920 to 107 in 1924, coal drops to 72 and recovers to 85; petroleum soars to 166; pig iron drops to 45; cotton drops to 59; sugar rushes up to 150, and automobiles to 181. Wheat—because people must eat it or die—is the sanest curve of the lot, but corn drops to 77 in 1924. Boots and shoes are better than coal and pig iron, but they drop to 86 in 1921. There is plenty of fault to be found with the table from the standpoint of statistical perfection, but no amount of technical fault-finding can becloud the point we desire to drive home—the astonishing lack of co-ordination between production and human requirement in the going industrial structure.

Basing his tabulations on the work of the Council of National Defense—with which organization he was long connected—Mr. C. H. Chase has calculated the percentage of production in relation to requirements the country over for various commodities in the year 1921.[5] Requirements he ascertained on the basis of the Ogburn family budget, and thus they tend to the minimum:

Fresh milk	91%	of requirement produced
Wheat flour	95%	" " "
Potatoes	92%	" " "
Sugar	85%	" " "
Beef	95%	" " "
Men's suits	83%	" " "
Shoes	85%	" " "
Coal	83%	" " "
Petroleum	90%	" " "
Housing	60%	" " "
Commercial building	110%	" " "
Automobiles	125%	" " "

Thus with a shortage in many prime essentials such as sugar, shoes, milk, and men's suits, and with only 60 per cent of annual building requirements met, commercial structures were overbuilt 10 per cent, and automobiles 25 per cent. Mr. Chase has pointed out other failures in co-ordination as follows: [5]

> With the home labor force inadequately provided for in food, shelter and clothing, and growing at the rate of 400,000 per year, industrialists before the war, were stimulating the importation of foreign labor at the rate of about 750,000 per year, thus making a bad matter worse.
>
> One New England town with a shortage of 5,000 dwelling houses, started to build new factories, requiring 10,000 additional workers, with no housing program at all.
>
> With an acute housing shortage in 1919, lumber production fell to 80 per cent of the 1916 output.
>
> For want of a timely afforestation program, 95 per cent of lumber mill equipment is doomed to be scrapped. It cannot be moved as the forests are destroyed around it.
>
> In 1919, with an undersupply of nearly all kinds of goods, advertising increased 70 per cent.
>
> In the post-war years of clothing shortage, cotton production (in bales) was cut to 80 per cent of capacity. The 1916 output of raw wool was 815,000,000 pounds. In 1919 it shrank to 275,000,000 pounds—about one-third of the 1916 output.

These comments, selected at random and based on the period immediately after the war, do not constitute a jaundiced view. The year 1919 was on the whole a fairly normal one. The case in the latter part of 1921, when the bottom fell out of the market, and millions of workers were walking the streets, showed co-ordination failures at their worst.

Mr. King C. Gillette, who is not without experience as a practical manufacturer, sets before us a leather-seated chair.[6] In the making of this chair, lumbermen have cut

down trees and floated them to the sawmill. The railroad has drawn the rough lumber to the furniture factory. Animals have been slaughtered, their hides tanned, and the leather shipped to the furniture factory. From the factory, the completed chair goes over the rails to the department store, where we buy it. During this process:

The lumber mill went on sawing logs trusting to luck to dispose of them.

The furniture factory fretted nervously as to the supply of wood and leather.

The tannery took a chance on selling its cured hides.

The machine shop which supplied woodworking machinery gambled on disposing of its product.

The furniture factory watched department store sales, fearing cancellation of orders.

The department store advertised chairs, but had no knowledge if they were needed.

The whole process was dependent on the railroads which were liable to get into a tie-up due to an overproduction of soft coal.

Uncertain sales, uncertain sources of raw materials, uncertain transportation—that is Mr. Gillette's view of the normal course of industry.

Mr. C. E. Knoeppel reviews the situation from the engineering standpoint.[7] As he sees it there is a great excess of plant capacity due to frantic building when times are booming, only to be left high, dry and idle in normal times. If prices are very high, demand is stifled by a buyers' strike; if prices are low, demand is unduly stimulated "Both effects are vicious. The one lessens production directly by inflating prices, the other lessens production indirectly by first overestimating demand, which as a consequence inflates prices. If pig iron, for instance, could be produced at a uniform monthly tonnage rate during all times we should not have an abnormally low price; the tem-

porary excess would furnish pig iron in good times without an abnormally high price. It would be like storing the flood water in a reservoir and letting it out to irrigation as needed." Mr. Knoeppel concludes, soundly enough, that the evils of speculative purchasing and unscientific price setting can only be cured by a change in fundamental policy, not by a modification of administrative methods. In other words, this gigantic waste may be reduced only by operating industry on a co-ordinated, balanced load basis —as New York City operates its water supply; storing the flood in times of plenty, feeding it out in times of drought.

Mr. Hoover supports Knoeppel's view. "Our studies of industries show that we usually expand our equipment during periods of maximum demand and cease construction work in periods of depression." [8] This *doubles* the evil effect of the business cycle. In periods of depression, not only the workers making current supplies are laid off, but the construction workers building permanent plants lose their jobs.

The need of co-ordination in the building trades, is admirably set forth by the Federated American Engineering Societies in their report, *Seasonal Operation in the Construction Industries*. As we saw in the last chapter, construction workers lose 100 working days a year on the average due to the seasonal nature of the industry. Yet the seasonal curve is largely habit. Better planning could keep most construction work going in the winter. The report concludes that the technique of the industry has advanced to the point where this is possible. For seasonal variations which are not susceptible to such a program, there is the continuing need of public works—water systems, roads, schools, public improvements generally. But the private business man cannot carry this out; it requires too much capital and too wide a co-ordinated control.

Again, "in the late summer and early autumn when crop and coal movements are at their height, the construction industries have added to the peak of railroad traffic by calling for heavy movements of building materials."

The lack of co-ordination in the transportation system has been strictly dealt with by many students, among them Mr. E. J. Clapp: "We have no American railroad system. The lack of system makes itself most severely felt in the planlessness and inconvenience of competitive railroad facilities in our large cities and in the enormous expenses that these duplicate terminals impose on the rail carrier. The solution of the rail problem lies not in pursuing the chimeras of higher rates and lower wages but in cutting out this vast terminal waste."[9]

Terminals are now like a half dozen competing telephone systems. Two-thirds of all railroad expense is paid out for terminal service. One railroad gets a pier in lower Manhattan. Every other road seeks to do likewise—and the same with the 23rd Street waterfront, the 42nd Street waterfront, the lower East Side. Any community plan for an integrated waterfront development is shattered. Railroad cars which can be unloaded on dry land, monopolize the choicest locations along the piers.

Again, a new industrial section is developed in a middle western city. Five railroads serve the city. Whereupon each road extends its line to the new section. Five freight houses, five storage yards, five track areas are duly built. A single branch line, jointly owned, connecting each carrier with one freight house, one storage yard, and one staff of employees could give better service and cut the operating costs if not to a fifth, at least to a third of the competing arrangement. What one carrier gains by beating the other roads to a prime location in terminal A, he is liable to lose by being second fiddle in terminal B. Unified terminal

facilities, according to Mr. Clapp, would not only cut terminal costs in half, but would allow the several carriers to earn as much, if not more than they now earn. Even from the money-making standpoint the current procedure is wasteful. President Walter Banham of the New York Board of Trade and Transportation points out that "the average freight car is rolling along 10 per cent of the time, and standing still the other 90 per cent of the time. New York loads lie in terminals three days on the average. . . . Freight and terminal congestion account for incalculable waste."

Excess Plant Capacity

In nearly every study of industrial waste which engineers have made, a greater plant capacity than normal demand calls for has been found. It seems to be due to two causes: first, the competitive organization of the industrial structure makes for duplication; secondly, even in those industries where monopoly obtains, seasonal variations and the business cycle force a "peak load" plant capacity. We have used the term "balanced load" repeatedly in the foregoing pages. If the reader is an engineer he needs no further explanation. For the laymen, let us give a specific definition.

Suppose as a shoe manufacturer you have to make 9,000 pairs of shoes in a year to meet your market. The least wasteful way to make them is in a shop just big enough, and with just enough machines to turn out 30 pairs a day which, on the basis of 300 working days, will give the 9,000 pairs. But suppose your orders are for 3,000 pairs in February, for the spring trade, and for 3,000 pairs in August, for the fall trade, and that these orders are not given—due to style factors—until the first day of those months. To meet the order you must enlarge your shop

to a capacity of 100 pairs a day. In February and August you are working furiously on a 100 pair a day basis. Thus you produce the 6,000 demanded. During the other ten months, your output averages hardly more than ten pairs a day. February and August are the "peak load" months, and they determine the capacity of the shop. You must accordingly have over three times as large a shop, and three times as much machinery, to make 9,000 pairs of shoes on a *peak load* basis, as you would require on a *balanced load* basis of a steady 30 pairs a day.

The peak load principle operates almost universally throughout industry. It wastes man-power in:

(1) Labor which goes into the construction of excessive plant space and excessive equipment to fill the space.
(2) Labor required to repair, guard, insure and otherwise maintain idle plant facilities. The vast bugaboo of "overhead cost" is to a large extent idle plant cost—and in the last analysis boils down to excessive man-power cost engaged in the upkeep of idle buildings, idle equipment, idle facilities of all kinds.

By the end of 1920, there was one motor car in use for every 12 people in the United States. By the year 1926, Mr. L. P. Ayres has estimated that the increase in the number of automobiles per capita will practically cease—the saturation point will have been reached, the novelty worn off, and everybody who can afford a car will own one by that time.[10] Thereafter, the output of the industry will tend to be regulated by the annual replacement of cars which have worn out. Such a replacement factor will call for not over 1,500,000 cars a year. Meanwhile the present plant is capable of producing 2,700,000 cars a year, and plant capacity is steadily growing. New capital continues to flow into the industry. Already the capacity is 1,000,000 cars a year in excess of the demand. By 1926,

the industry will find itself with a capacity of over 2,700,-000 cars to fill orders aggregating not more than 1,500,000 cars, leaving an excess capacity of 1,200,000 cars. This, according to Mr. Ayres and the Cleveland Trust Company, is what lack of co-ordinated planning is doing to the automobile industry. Mr. Fred Colvin, editor of the *American Machinist*, estimates a current capacity of 5,000,000 cars. Meanwhile, the excess capacity in the rubber tire industry is about 1,200 per cent.[3]

Blast furnace capacity has been analyzed as follows: [11]

	Capacity	*Actual Output*	*Idle Excess*
1914	44,405,000 tons	23,332,000	21,073,000
1918	49,270,000	39,055,000	10,215,000

In 1914, a bad year, only about half the capacity was used. In 1918, a war year, and a boom year, there was still an excess of about 20 per cent. Mr. Polakov, a mechanical engineer, has calculated that the upkeep cost of idle blast furnaces has averaged $79,000,000 annually for the last decade.

The capacity of steel plants increased 46 per cent from 1913 to 1921. In the latter year the *Iron Trade Review* estimated total capacity at 54,120,000 tons. Meanwhile normal requirements are 32,000,000 tons. The steel industry is accordingly about 70 per cent overequipped. Nevertheless steel companies continued to extend their facilities even in the depression of 1921.

Copper smelters in 1916 had the capacity for heating about 22,500,000 tons of ore, but only 11,000,000 tons were actually smelted. Copper wire, sheet, and brass mills had in the same year a capacity of 2,000,000,000 pounds. The actual output was in the neighborhood of 800,000,000 pounds. The zinc industry has a smelting capacity of 800,000 tons of spelter. The pre-war maximum output

was 353,000 tons. Brimstone plants have the facilities to make 2,000,000 tons annually; demand seldom exceeds 1,000,000 tons.[12] The United Forest Service has made the following estimates in respect to lumber mills: [13]

Total mill capacity....................	117,487	million board feet
Normal annual cut.....................	37,346	" " "
Ratio of capacity to annual cut........	3.15	

Over three times as much mill capacity as is needed! The shoe factories of the country have a capacity of 1,750,000 pairs per day. The normal output is 977,000 pairs, an excess capacity of nearly 80 per cent.[7] The United Typothetae finds an excess capacity of from 50 to 150 per cent in printing plants—"hundreds of millions in idle equipment." [7]. A fluctuation of 50 per cent in the number of employes in a year is not unusual in large plants doing mail order catalogues and railway printing. There are about three times as many flaxseed crushing plants as are needed to take care of the linseed oil (paint) requirements of the country.[14] In edible oil plants, the "capital outlay is nonproductive for the greater part of the year; operating time approaches six months as a maximum." [15] The annual consumption of sugar is about 4,000,000 tons. Sugar refineries are equipped to produce 8,000,000 tons.[16] In the men's clothing industry, seasonal demand forces widespread excess capacity. In the plants studied by the Federated American Engineering Societies the normal output of clothing could be secured with from 31 to 86 per cent less capacity, provided the plant could be operated steadily the year round.[7]

Peak loads are not always cyclical or seasonal. They may occur weekly or daily. The Federal Trade Commission in its report on the Meat Packing industry shows Monday and Wednesday peaks in the run of animals over the killing beds. Slaughtering plants must be designed to

handle these peak runs. On other days in the week, much of the capacity is idle.

We could go on indefinitely. Every industry, save perhaps the postal service and the Bell Telephone Company has its excess capacity problem, and the Scientific Management movement in recent years has collected a great flood of data thereon. In these premises, one wonders sometimes at the hue and cry concerning the needs for new capital. We are periodically deluged with thrift campaigns, savings campaigns. We are told that industry is "starving for capital" . . . softly, or "capital will leave the country." Perhaps in the light of these figures it would be not altogether calamitous if capital did leave the country for a while, and thus give the engineers a chance to catch up with themselves!

Even in our public school plant there is a costly element of excess capacity due to failure to use the equipment uniformly through the school day. The "work-study-play" plan is making inroads upon this loss, but Miss Alice Barrows of the United States Bureau of Education, estimates a waste of 33 per cent in the operating cost of the traditional school.

Mr. David Friday in 1921, attempted a rough summary of waste due to excess plant capacity: "If the war taught us anything that is of consequence for peace-time industry, it is that we ordinarily allow a large part of our productive capacity to run to waste through sheer idleness—a waste of probably not less than $5,000,000,000 a year." [17]

Five billion dollars is equivalent to the man-power of 2,500,000 workers. We have checked this figure by the following rough calculation. The total value of the whole industrial plant in the country—factories, railroads, mining works, office buildings—probably reaches $100,000,000,-000, based on an analysis of the figures showing total na-

tional wealth.[18] On the basis of an excess plant capacity of 30 per cent, the value of idle plant would be $30,000,000,-000. On the basis of a 10 per cent upkeep factor, the total cost of maintaining this idle plant—insuring it, guarding it, repairing it—would be $3,000,000,000. Dividing again by $2,000 we secure the equivalent of 1,500,000 workers, manual and clerical. To this must be added the labor wasted in constructing plant space which is never to be adequately utilized. We doubt accordingly if Mr. Friday's estimate is on the whole excessive.

Restriction of Output

Lack of co-ordination in balancing production against requirements leads inevitably to restriction of output—both on the part of management and men. Owners restrict output to maintain prices or to force higher prices. Labor restricts output to make jobs last longer and so stave off the gaunt shadow of unemployment.

Output may be restricted either by refusing to make, or by scrapping or destroying what is made. To illustrate: The Brazilian government restricts the coffee acreage to a crop which will yield a good price; a fruit company, finding the banana market in New York below normal, may dump a shipload into the waters of the harbor. In an economic system based on price considerations rather than upon the direct satisfaction of wants, restriction of output is bound to be one of the major elements of waste in production. In a functional society with approximate output calculated in advance, productive capacity would be geared to such output, and restriction in the sense of operating below capacity, or "dumping" finished goods would not obtain, as there would be an assured market for everything produced. Not to the pound, of course, but generally speaking—for the main economic essentials.

The waste in man-power is only too clear. Where restriction takes place at the source, idle plant results, involving the upkeep outlays noted in the last section. If restriction takes place by destroying the finished product, the labor of all who brought the product to completion is thrown away. If restriction takes place on the "ca canny" principle, the worker is obviously using more time on the job than the job calls for.

Veblen has dwelt more on restriction of output than perhaps any other economist of the first rank. For it he has coined the phrase "the conscientious withdrawal of efficiency. . . ."[19] "The material interest of the underlying population is best served by a maximum output at a low cost, while the business interest of the industry's owners may best be served by a moderate output at an enhanced price. . . . It is not possible on sound business grounds to let the industrial forces of the country go to work and produce what, in the physical sense, the country needs; because a free run of production would, it is believed, be ruinous to business, because it would lower prices and so reduce the net business gain below the danger point, the point below which the fixed charges on outstanding obligations would not be covered by the net returns. Hence what is conveniently called capitalistic sabotage or businesslike sabotage on industry."

In other words, Veblen sees the large corporate interests, particularly those which have secured monopolistic control of an industry—as in oil, meat packing, aluminum, anthracite coal, steel—continually forced by the considerations of maximum profit, to control output, not on a prolific and a low cost basis, but on a moderate volume and relatively high cost basis. Thus is the "net" best safeguarded. If this analysis is sound—and we believe that it represents at least a powerful tendency—restriction of

output on the part of management plays a very great rôle indeed in industrial affairs, and to that extent, adds to the volume of waste. The economic history of America is filled with dramatic cases of "corners" and "pools"—in wheat, in oil, copper, railroads, cotton—all of which have their birth in a desire to raise prices by restricting output.

One wonders what the Scientific Management engineers can do when they collide with this principle. Their work in such an event can only be a saving at the spigot while the bunghole runs. One wonders further, how far the obvious economics of monopoly, the saving in overhead and what not, are true economics when "conscientious withdrawal of efficiency" is given its due weight. In restriction of output the old conflict between the engineer and the business man is thrown into highest relief. The true engineer wants to see the shop running at approximately full capacity every working day—maximum output, minimum effort. The true business man with his eye on his sales sheet, cannot afford to think of the shop in such terms. If more money is to be made by going on half time, then he must go on half time. And it is the business man and not the engineer who has the final word.

The Rubber Growers' Association in the British Malay States restrict production to a point which keeps the price above 50 cents a pound.[20] Yet, at 30 cents a pound, 20 per cent dividends are possible. In this case there is no danger of glutting the market, for the uses of rubber, at a low price, are endless—roofing, siding, painting, waterproofing, electrical appliances. There is hardly one single substance which, if it were permitted, could so cater to our comfort and convenience.

The English herring catch was artificially restricted in 1920 when the poor of England were facing a bitter winter of unemployment.[21] Yarmouth boats were forbidden

to go to sea on certain days, and could only fish so many hours. This was felt to be necessary because—the normal Russian market being cut off due to nonrecognition of the Soviet Government—if the whole catch was landed in England, prices would go to ruinous levels. Yet the unemployed of England, God knows, would have been glad of the herring. In 1921, Brazil was burning coffee for fuel, and arranging an artificial restriction of the rubber crop. The same year the Indian Tea Association cut the crop to 80 per cent of normal. Meanwhile the cotton planters of Oklahoma were organizing a "growers' strike" by which the 1922 crop was to be cut in half. The Great Packers—Messrs. Armour, Swift, Morris, Cudahy and Wilson—have restricted production by entering into private agreements among themselves to limit their kill to certain fixed percentages of the total steer market. This policy from time to time has had a profoundly discouraging effect on the raising of beef cattle on the farms—as the Federal Trade Commission has been at pains to point out. The New York Commissioner of Markets once explained why Thanksgiving turkeys cost consumers 75 cents a pound. He said that 200 carloads of turkeys and other poultry were held in New York on side tracks, while dealers held prices at the point of all the traffic would bear. Mr. Huston Thompson, of the Federal Trade Commission, has probably had as much experience as anyone in the country with collusive restriction of output. Writing in the *Dearborn Independent* (April 4, 1925), he says: "The records of our courts show that these price fixing associations have indulged in lawlessness, such as blacklisting all those who did not live up to their regulations. . . . In a study of the records of hundreds of them I have never yet found those in control making a drive towards reducing prices. . . . On a falling market, after a buyers'

strike, the effort is to prevent price reductions and to maintain or increase existing levels by *curtailment of production*."

But collusive agreements on the whole, while much in evidence, probably do not account for nearly the volume of waste which arises more or less automatically—by simply shutting down the plant and laying off the men, when price levels decline or threaten a decline. Yet occasionally captains of industry have their moments of doubt. Mr. Fordyce Jones, a rubber magnate, recently searched his soul to this effect: "We are all going wrong in our vision in looking on our customers as cows to be milked instead of cattle to breed from. Our markets are waiting to be made." With this delicate introduction he advocated more rubber goods at cheaper prices.

Dumping

In 1920, thousands of gallons of milk were poured into rivers and creeks of southern Illinois.[22] In the fall of the same year, the Potomac River below Washington was afloat with watermelons—a trainload having been dumped from the wharves to avoid breaking the city price below 25 cents.[23] On June 24, 1924, the New York *World* announced: "Thousands of packages of cucumbers and other fresh vegetables were dumped on the offal dock today." In October, 1921, placards were placed along the highways in middle western states, advising the farmers to burn corn instead of coal. The corn crop was smaller than in 1920, but the bottom had dropped out of prices, due to the panic. The "night rider" is a well-known figure in the South—burning tobacco and cotton when price levels are in danger. Every few years a large percentage of the Maine potato crop is left to rot in the ground. In 1924, 5,000 cars of Georgia and Alabama peaches rotted in the

orchards because the prices offered by dealers were not enough to pay the cost of gathering, boxing and freight to market. "While these peaches were being wasted, peaches were retailing in New York at from $3.00 to $3.50 a basket." [24]

This wanton destruction of good foodstuffs—when people are in want of food—excites our indignation, but it is difficult to voice it upon the destroyers. They acted as they had to act, as any one of us would have acted. Their crops, in terms of price, were not worth the transportation charges to get them to the people who were ready enough to consume them. The whole phenomenon illustrates again the waste which inevitably arises, failing a co-ordinated plan to balance requirements against production.

Restrictions by labor

While the net loss due to restriction of output on the part of labor is small compared with that found on the part of management, it is, in the aggregate, a considerable item of waste. Again no personal stricture is possible, because it is carried on from stark necessity. It is an attempt to make work last longer, and so lessen the miseries of unemployment. This conclusion is borne out by the fact that such restrictions are particularly prevalent in those trades—like building and printing—where the seasonal factor is high, and unemployment a periodic evil. Bricklayers attempt to restrict the number of bricks to be laid in a day; lathers attempt to restrict the number of bundles of laths to be nailed up in a day; plasterers, the number of square feet to be covered; painters, the width of brushes, and the use of spraying machines.[25] Mr. Gow of Boston has estimated that restrictions imposed in that city by labor organizations, increase the cost of

building by 25 per cent. The average increased cost the country over, he calculates at 10 per cent.[26]

Economists make the further point that not only is there waste from restriction of output by labor, but that the present industrial organization tends to force labor to lose its habits of workmanship. "There is no more fatal obstacle to efficiency than the revelation that idleness has the same privilege as industry, and that for every additional blow with the pick or hammer, an additional profit will be distributed among shareholders." [27] As soon as labor learns that there is not plenty of room at the top—and millions have already learned it—the whole spirit of craftsmanship tends to go into decay. The worker becomes like everyone else, a business man intent on selling his product—in this case his labor—at all the traffic will bear. Under such conditions, restriction of output and poor workmanship become as inevitable as the rising of the sun. Granting certain stimuli, psychologists have taught us how to calculate the response. Only a whole new industrial orientation—such as is implicit in a functional rather than in an acquisitive society—can cope with this bitter problem. "For it is not the niggardliness of Nature nor the backwardness of science nor the inefficiency of labor that checks productivity, but the refusal of man to set science to do her best with Nature. Employers, workers, politicians, conspire to hold back productivity to half the real income they might enjoy."

To H. G. Wells belongs the summary: "The idea of cornering a drug struck upon my mind then as a sort of irresponsible monkey trick that no one would ever be permitted to do in reality. I thought it was part of my uncle's way of talking. But I've learned differently since. The whole trend of modern money making is to foresee something that will presently be needed and to put it out

of reach and then to haggle yourself wealthy. You buy up land upon which people will presently want to build houses, you secure rights that will bar vitally important developments, and so on and so on. Of course, the naïve intelligence of a boy does not grasp the subtler developments of human inadequacy. He begins life with the disposition to believe in the wisdom of grown-up people; he does not realize how casual and disingenuous has been the development of law and custom, and he thinks that somewhere in the state there is power as irresistible as a headmaster's to check mischievous and foolish enterprises of every sort. I will confess that when my uncle talked of cornering quinine, I had a clear impression that anyone who contrived to do it would pretty certainly go to jail. Now I know that anyone who could really bring it off would be much more likely to go to the House of Lords.[28]

Commercial Failures

Because industry is unco-ordinated, the death rate of new companies is high. Many failures, of course, are due to bad management, many are due to deliberate fraud—their promoters organizing them only for stock selling purposes—but a sufficient number remain due primarily to ignorance of national requirements. New companies are continually jamming their way into an already overcrowded field—particularly in boom periods when prices are high. They may get a few handfuls of velvet while the boom lasts, but with the drop of the curve they go to the wall. New companies are continually starting operations in fields where the demand is unknown, they "guess" they can break down sales resistance by a spirited advertising campaign, and they guess wrong.

From 1862 to 1917, 163,729 new companies were registered in England. On April 30, 1918, the surviving com-

panies numbered 66,456.[29] Of every 5 new companies started, 2 had survived and 3 had gone to the wall.

Recent American experience shows:[30]

	Number of Failures	*Total Liabilities*
1910	12,652	201 millions
1914	18,280	357 "
1916	16,993	196 "
1918	9,982	163 "
1920	8,881	295 "
1921	19,652	627 "
1922	23,676	624 "

Note the increase in the depressions of 1914 and 1921. Each one of these failures means as a rule, legal cost, idle plant and equipment, men turned on the streets. Many of them, if co-ordination had been the rule, would never occur, because, with a sounder knowledge of wants, incorporation would not have been undertaken in the first place.

In connection with business failures, we have to remember the well-recognized practice of organizing a company for the specific purpose of selling it out to a competitor—often to be scrapped in toto by the competitor when obtained; we have to remember the $400,000,000 lost annually in fraudulent bankruptcies;[31] and the exasperation, almost universally experienced, of trying to get a new part for a machine or an appliance, the maker of which has gone out of business.

Community Planning

In the discussion of land speculation, in an earlier chapter, we devoted some attention to the wasteful manner in which our cities have been built. Only Washington has followed a consecutive plan. Co-ordinated development has largely fallen by the wayside, to the confusion and congestion and unhappiness of city dwellers. It is

too late to do much about it. There is too heavy a financial investment at stake in the present jumbled layout. Not without interest, however, is the report on City Planning prepared by a special committee of the American Institute of Architects in 1924. The report bases its case on New York, but its implications are nation wide. It stars with a definition and a distinction: "City Planning is the promotion of commercial values. Community Planning is the promotion of human values."

America has had a little City Planning, but no Community Planning to date. New York, says the committee, has been developed solely on commercial principles involving maximum land values. Parks and playgrounds have been simply eliminated. It is easier to sell land by the front foot on the gridiron basis of street layout. So, down the gridiron has gone, rolling out all natural contour, landscaped development, or natural land use. Still worse, the gridiron has moved with rectangles (blocks) running east and west the long way. This has had two evil effects. As the sun moves from east to west, only the *end* houses in the blocks get sunlight, and that for only half a day. Placed the other way, *all* houses in the blocks would have had morning sun on one side, and afternoon sun on the other side. Secondly, due to the long narrow shape of Manhattan, the pressure of traffic is north and south, while the block layout gives approximately two streets east and west for every one which runs north and south. Arranged the other way, a great load would have been lifted from traffic congestion. The present block layout makes for dark interior rooms, wasteful corridors; and gives equal widths for tenement, private house, public building, factory and store—when each obviously needs separate treatment. In short, New York "has been built to suit lots, not inhabitants." The

present land cover in New York is about 70 per cent. Architects know how to house an equal population, infinitely more comfortably, with only a 50 per cent cover. "It was the falsely conceived possibilities of profit-taking that induced us to build structures approximately 20 per cent of whose volume is utter waste and more. For by so doing we reduced our light and air so much." But the technique of architecture has not been given a chance. Community Planning, as the American Institute of Architects points out, is unknown in America. The waste of man-power is only too obvious: Labor lost in traffic congestion; the increase in the accident and disease rate; increased construction costs due to building within confined areas, and in adapting buildings to lots for which their uses are not suited; the vast outlays for subway and elevated lines which a planned community would not need or tolerate; the increased fire risk, and the added clerical labor in insurance offices. . . . To say nothing of the twilight life, physical and mental, with which the dweller in a congested city must content himself.

Industrial Decentralization

Henry Ford has discovered that maximum efficiency in mass production is not necessarily secured by a high degree of centralization in population and in industrial plant. This sounds like a paradox, but turns out to have elements of sound common sense, commercially as well as humanly. He says: "We started assembling a motor car in a single factory. Then as we began to make parts, we began to departmentalize so that each department was a little factory in itself. Then we found that we had made another new discovery, which was that by no means all of the parts had to be made in one factory. . . . When we began to make our own parts we practically took for granted that

they all had to be made in the one factory—that there was some special virtue in having a single roof over the manufacture of the entire car. We have now developed away from this. If we build any more large factories, it will be only because the making of a single part must be in such tremendous volume as to require a larger unit. This is a development which holds exceptional consequences, for it means . . . that highly standarized, highly subdivided industry need no longer become concentrated in large plants with all the inconveniences of transportation and housing that hamper large plants. *A thousand or five hundred men ought to be enough in a single factory;* then there would be no problem of transporting them to work or away from work, and there would be no slums or any of the other unnatural ways of living incident to the overcrowding that must take place if the workmen are to live within reasonable distances of a very large plant." [32]

When Ford speaks as a technician—not as a philosopher at large—he commands our attention; for he speaks out of the wealth of his demonstrated experience. He sees waste and loss in huge single plants, because he has found by actual experience that less man-power is needed in the end to operate—under one control—smaller decentralized plants. Thus he builds a new valve plant eighteen miles out in the country so that the men who work in it can also be farmers. "The belief that an industrial country has to concentrate its industries is not well founded. That is only a stage in industrial development."

Seventy-five per cent of the population of New York State lives on 15 per cent of its area. New York City has 50,000 people to the square mile, and within a ten-mile radius, areas can be found with only 500 to the square mile. "Fertile farm land is wasted; localities that would

be ideal for industrial purposes are underpopulated, while other districts are so overpopulated that their economic efficiency is impaired."[33]

Of all savings of waste through co-ordination, a program of decentralization excites us most, as it promises the most in terms of human welfare. An arrangement of industry which will relieve the congestion of the cities, and yet bring cheap power and more cultured life to the countryside, is a "balanced load" almost too good to be true. Yet Ford is making it true.

Plant Location

Fifty per cent of all manufacturing in the country is done in the Northeast seaboard region; 35 per cent is done in the Middle West; 9 per cent in the South, 6 per cent on the Pacific coast.[34] If we plot on a map the location of factories, and superimpose above it a map of the sources of raw materials—coal, cotton, wool, oil, ores, leather, lumber, grains, waterpowers, we will find that the correlation is not close. We have coal in Pennsylvania, but nearly all the other bulky products must be moved by long haul from the South and West to the great factory center on the eastern seaboard. Made up into goods, a large percentage must be duly moved, by long haul, back again. In selecting factory cities, local conditions are often inadequately studied. Three large chemical factories were recently built only to be declared public nuisances and forced to move. In locating a new factory, one must consider: source of raw materials, labor supply, power supply, climatic conditions, housing conditions, markets. These considerations have been too frequently neglected.

Messrs. Gilbert and Pogue point out in *America's Power Resources* the astonishing kindliness of Nature in furnishing those regions in America which are short of coal de-

posits, with abundant water power. Nature has *balanced* the power load. Do we take advantage of it? We do not. We haul coal into the water-power states, and try to develop water-power in the coal states. The center of production of lumber has shifted progressively from New England to the Pacific Coast. The shipments of western timber to the East, where mills are concentrated, is increasing all the time. The usual route is via the Panama Canal to New York and thence by rail to Eastern mills. Thus we have mills without forests in the East, and forests without mills in the West. Meanwhile 60,000,000 acres of potential forest lands accessible to the Eastern and Lake States are lying unproductive—their only crop an occasional devastating fire.

Uneconomic location is probably responsible for a wide margin of waste, but the problem of picking up a whole industry—say the boot and shoe industry of New England—and moving it nearer its natural raw material, sales, and power center, is one of such magnitude, involving such large capital outlays, that wholesale plans of relocation can hardly enter into our computations of waste. We can only say that a functional society would move in that direction. As the old plant wore out, plans would be made to place the new plant nearer its natural home. The drift of cotton mills to the South, and of shoe factories to Missouri, are examples of such a policy—working within the present business structure.

World Co-ordination

We cannot close this section on community planning without at least a word on world co-ordination. "Our world system is so ordered that for a long way on every hand of a new calamity the spreading wave carries prosperity and joy. . . . A famine enriches vast interests and

classes in first effect . . . with the coming of famine news, every farmer in three continents goes home to tell his wife good times have come again." Speculators, traders, export houses, bakers—all share in the glad tidings. Thus William Bolitho prefaces his investigation of certain famine areas in Europe.[35] A system which wrings joy from starvation and death is not, biologically, a very sound system.

The Supreme Economic Council of the Allied Nations during the war gave us a hint at least of how a better system might function. The whole surplus output of an exporting nation was bought up in bulk by the Council and delivered direct to needed points—thus eliminating the services of untold hagglers and middlemen. Is it too much to imagine the Wheat Division of the League of Nations, surveying the acreage and probable yields of American, Russian, Argentine, Egyptian and Indian fields, and suggesting the allocation of the output on a minimum haul basis to the nearest importing area—to the end that starvation and famine might be held perpetually in abeyance? Whether or not it is too much to imagine, the League of Nations is actually (in 1924) working on the problem.

Against such common sense procedure consider tariff and trade barriers and what they mean in lost man-power. They may pump artificial blood into an infant industry which—due to plain geographical causes—should never have come to birth at all; they create a swarm of inspectors, officials, busybodies, and lobbyists; they enormously increase the freight mileage of steamships, for straight trade routes from low cost production countries to willing consumers in other countries are bent into hoops and circles when they strike a tariff wall. Says Veblen: "The great standing illustration of sabotage administered by the government is the protective tariff. It protects certain special

interests by obstructing competition from beyond the frontier. This is the main use of a national boundary. The effect of the tariff is to keep the supply of goods down and the price up at the cost of the underlying community. A protective tariff is a typical conspiracy in restraint of trade."[36]

The Throttling of Knowledge

Technical knowledge in a functional society would be free. To the inventor of a new process would go honor, and quite possibly, royalties, but society as a whole would share immediately and freely in the technical gains made by its scientists. Under the acquisitive organization, society shares in scientific discoveries, but only to a degree, and only after a period of maximum obstruction. Chief Clerk Woolard of the United States Patent Office states the case: "There are countless numbers of patents which, if in operation, would much cheapen the articles they could produce, but they are intentionally shelved to prevent competition. Concerns operating under old inventions for which they have expended great sums to erect plants, buy up these new and cheaper methods to prevent competitors from getting hold of them. They then tuck them away in their safes, never to be used."

New inventions may not only be suppressed, they may be *pre-suppressed.* A concern may get patents on a whole series of processes in order to tie up the field for the next generation or more. The scale industry is said to have secured advanced patents (by taking them out on some foolish toy) sufficient to close the door to anyone else for twenty years. The ultimate social loss of this one case alone has been roughly estimated at $100,000,000.[3] The "nuisance value" of a patent is a recognized legal term. Radio is particularly prolific in giving rise to litigation

suits—damage and preventive. "There is probably not a manufacturer in the entire radio commercial field who does not keep busy a battery of lawyers at all times bringing suits for patent infringement or defending such suits." [37]

"Secrecy and mystification may be good for trade, but they are altogether bad for industry." [36] Patents, secret processes, secret formulae, make individuals and companies rich, but often they tend to impoverish society. Think of the duplication in research work that such a throttling of knowledge entails. In the chemical industry this condition is cited as one of the main elements of waste. If each discovery as it is made, is kept secret, it means that other research workers in the same field may toil indefinitely only to find, when they are done, that somebody else has got there first. If scientific advance could be kept free and accessible, with proper reward for the inventor duly secured—a large amount of labor power which now trades on the processes of patenting and mystification—lawyers, "fixers," patent clerks and the like, would be released to useful service, a large amount of duplicated scientific research would be saved, and above all the way cleared to let society benefit at once and directly in the new discovery.

A Summary of Wastes in Production

Man-power losses by reason of wastes in consumption were difficult to estimate as compared with losses due to idleness. Any comprehensive estimate of man-power wasted through current methods in the technique of production is not only difficult, it is impossible. In the last two chapters we have described the more significant factors in that waste. We have given illustrative facts and figures. But recapitulation in quantitative terms could result in little more than absurdity. In summary, all we

can do is to name again the main sources of friction and loss in production, and in the two cases of excess plant capacity and standardization failures cite the quantitative summaries of Mr. David Friday in the first case, and the United States Chamber of Commerce in the second.

Wastes in production from the standpoint of scientific management

1. Failure to adopt production standards.
2. Faulty material control.
3. Overloaded inventories.
4. Lack of system to place responsibility.
5. Lack of cost systems.
6. Lack of research facilities—for product and for markets.
7. Failure to utilize machinery instead of "cheap" labor.
8. Failure to increase efficiency by reducing hours, and regulating shop conditions.
9. Failure to adopt standardization in units of measurement, sizes, styles, grades, qualities, nomenclature: standardization primarily in intermediary processes rather than in end products—in "sewer pipes rather than in women's hats." Failure to adopt the metric system of weights and measures. The total loss is assessed by the United States Chamber of Commerce at one-quarter of all industrial effort—representing the labor of at least 5,000,000 workers—not including farmers and the overhead trades. Cutting this in half to allow for duplications in other fields, we may say without serious contradiction that standardization failures probably account for a loss of 2,500,000 workers in the technique of production.

Wastes in production from the standpoint of industrial co-ordination

1. Inadequate knowledge of requirements and the failure to gear production to such requirements brings about cyclical and seasonal peaks and depressions in industry. This forces a "peak load" principle in industrial plant rather

than a "balanced load." Excess plant capacity results, the loss from which is estimated by Dr. David Friday at $5,000,000,000 dollars annually—the equivalent of 2,500,000 workers. Our own estimate is at least 1,500,000 based on the maintenance of a 30 per cent plant idleness factor. Allowing for construction as well as for maintenance, we are inclined to believe that a man-power of 2,000,000—500,000 less than Mr. Friday's figure—is a minimum estimate for waste of this nature.

2. Restrictions of output—by management, by labor, by farmers—including the factor of "dumping" or destroying finished products.

3. Commercial failures, insofar as they are based on ignorance of requirements, or engineered for the purpose of selling out to competitors.

4. Tariff and trade barriers.

5. The absence of community planning—over-centralization, city congestion, uneconomic location of industry.

6. Trade secrecy, suppression of inventions, the "profitable obstruction" of technical knowledge.

We can locate a man-power loss of 2,500,000 through standardization failures, and 2,000,000 through excess plant capacity. The total of 4,500,000 is accordingly all we have any right to segregate in the field of wastes in production. After allowing for producers whose output is illth—say 5,000,000 of the 20,000,000 in manufacturing, mining and transportation—we are left with at least 15,000,000 workers in these fields whose output is sound goods. Meanwhile the studies of the Federated American Engineering Societies in six typical industries disclose a ratio of waste in production of from 30 to 50 per cent. If 40 per cent is the average for all industry, the total lost man-power is 40 per cent of 15,000,000 or 6,000,000. This is a moderately wild guess, but perhaps it does serve to indicate that our segregated total of 4,500,000 for non-standardization and for the upkeep of idle plant—which is the only total figure

we shall use—is not excessive as representing the waste in the whole field of the technique of production.

But the case must stand, as we have already said, primarily on the qualitative description and the illustrative figures drawn from this corner and that of the industrial process. No man can estimate within millions of workers what a degree of co-ordinated control, standardization, and a wider application of Scientific Management might mean in saved man-power, or in its equivalent—increased production.

CHAPTER XI

WASTES IN DISTRIBUTION

There is gathering opinion in the United States that it costs more to distribute things than it does to produce them. We say opinion advisedly. To date we have never seen a clean-cut definition of what constitutes production as distinct from distribution. A farmer is a producer—of course. Is he? Suppose he is growing cotton which is to be made into sheeting with which to cover and protect department store tables? Glass factory workers are producers, of course. But how much of their product goes into plate glass windows for retail stores? A miner is a producer. How much of the coal he wins is used for moving freight cars, heating warehouses, and providing light for wholesale markets? The Census of Occupations gives us the following:

	1910	1920	*Per Cent Increase* 1920
Farmers and foresters	12,659,000	10,951,000	13.5% decrease
Miners	965,000	1,091,000	13.1
Manufacturing and mechanical workers	10,659,000	12,813,000	20.2
Total primary workers	24,283,000	24,855,000	2.4%
Transportation workers	2,638,000	3,066,000	16.2%
Retail and wholesale workers	3,615,000	4,244,000	17.4
Clerks	1,737,000	3,120,000	79.6
Professional workers	1,663,000	2,153,000	29.5
Domestic service	3,772,000	3,400,000	9.9 decrease
Miscellaneous	459,000	771,000	68.0
Total secondary workers	13,884,000	16,754,000	20.7%
Grand totals, gainfully employed	38,167,000	41,609,000	9.0%

The primary workers are obviously nearer to production than the secondary workers. It is clear enough from this table that the secondary workers are increasing their numbers at the expense of the primary. But there is nothing here which gives us more than the grossest kind of a division between man-power devoted to production as against distribution. Unnumbered primary workers are making plant and supplies for the transportation system, for the wholesale and retail traffic. Unnumbered secondary workers are serving as clerks, checkers, professional advisers, to establishments engaged solely in production. So, although the hullaballoo as to the mounting costs of distribution is loud enough, and genuine enough, and perhaps true enough, nobody seems to have saved his breath for a sufficient period to find out what distribution really means.

We offer this preliminary definition for what it may be worth:

Production is the making of goods for human consumption, and the making of plant (capital goods) for carrying on such work.

Distribution is the moving of goods from field and factory door to the consumer, and the making of plant whereby such goods may be moved.

On the basis of this definition we are inclined to doubt, if the man-power engaged in distribution is increasing greatly as against production, or approaches within millions the total engaged in production. The naked process of moving the product and selling it over the counter is wasteful enough as we shall see, but it is to be doubted if it is any more wasteful as a total phenomenon than the processes of production which have been reviewed in the past two chapters.

But what *has* happened is this: In 1880 there were listed in the Census 172,000 office workers; in 1920 the number had grown to 3,000,000.[1] Clerks have increased their quota seventeen times in the past forty years, while the population at large has only doubled. And the so-called overhead trades have been increasing relatively faster than the producer, or the distributor in the physical sense. Salesmen, agents, canvassers, advertisers, stenographers, bookkeepers, accountants, professional advisers, "service bureaus,"—these are on the upgrade as the clerical figures and the advertising figures show—but such white collar jobs have nothing to do with the physical labor of distributing goods—a pen, a typewriter key, a ledger page, a client's cigar, are the limits of lifting in the premises. Now while producers have undoubtedly increased their office help relatively per man employed over the days when the bosses' only ledger was his shirt cuff, it is nothing to the increase in man-power which has gone into the crafts allied to distribution—primarily competitive salesmanship. So if we widen our definition of distribution to include salesmanship as well as the sheer movement and the wholesale and retail handling of the physical goods, then it may well be that out of every dollar the consumer pays, not over 50 cents goes to the producer, while the remainder goes to the distributor and his allies.

It really looks as though there were three factors involved: the producer, the distributor in the physical sense, and the overhead worker—who neither makes nor distributes, but records and shouts and "serves." (In the latter category the authors of this book belong.) It may well be that it costs *less* man-power per unit moved to distribute than it did a generation ago (consider the mam-

moth cranes and freight handling devices of modern engineering), even as it undoubtedly costs less in man-power per unit produced. What is called the mounting cost of distribution lies in the increase of the overhead trades.

The art of salesmanship as we have noted many times in the foregoing pages is a growing and expanding art. The go-getter, the high-speed salesman, the advertiser have long since replaced the old line drummer. The best brains and the best salaries are to be found as a rule in the selling department. College graduates go increasingly into advertising agencies rather than into the finishing room. All this has greatly stimulated the technique of how to unhorse your competitor, but it is to be doubted how far it has provided a sound method for reducing the cost of living to the public at large. Salesmanship sucks up into overhead costs a greater and greater man-power. The public interest is best served by plentiful production with a minimum of overhead expense. The tendency of modern business seems to run in the direction of nullifying economies in production by throwing the gains into greater outlays for salesmanship. When to this factor is added the increases in the overhead trades pure and simple—professional people, clerks, bankers and brokers, hat checkers, door openers, bookmakers, moving picture workers, insurance people, correspondence school promoters and what not, we begin to see how the spread between the consumer's dollar and what the producer receives may be accounted for.

Mr. Sidney A. Reeve after unheard-of statistical labors in analyzing the Decennial Census, gives the following growth in "commercial" effort (distribution plus overhead), as against producing effort:[2]

	Production Effort	*"Commercial Effort," Selling and Distribution*
1850	80.2%	19.8%
1860	75.1	24.9
1870	72.0	28.0
1880	67.2	32.8
1890	63.3	36.7
1900	59.9	40.1
1910	53.5	46.5
1920	49.6	50.4

If these figures are to be trusted, it would appear that for every distributor in 1850 there were four producers, while for every distributor (on our expanded definition) today there is only one producer. We doubt if the margin is as great as this, but we do not doubt the tendency.

It costs 19 cents to make a Gillette safety razor for which you pay five dollars. The profit will not reach one dollar, leaving a "distribution" cost, including selling and advertising, of at least $3.80 as against the factory cost of 19 cents. According to the Department of Agriculture's crop reports, consumers paid, in 1922, $22,500,000,000 for all farm products (except livestock and cotton). The farmer received $7,500,000,000 for the same products, leaving a spread of $15,000,000,000—twice what the farmer got. In this spread, however, is a certain amount of manufacturing costs—canning, preserving, milling. Mr. E. P. Harris summarizes the same case in a little more detail:[3]

To farmers and food manufacturers	$10,000,000,000	50%
To railroads, truckmen, brokers	3,000,000,000	15%
To wholesale jobbers	2,000,000,000	10%
To retail stores	5,000,000,000	25%
Total paid by consumer for food annually	$20,000,000,000	100%

Mr. E. A. Filene, the head of a great department store, and thus pretty authentically a distributor has said: "The plain fact is that one of the great wastes of business is due to the incredibly inefficient methods of distribution. Today an article usually *doubles in value* between production costs and what the consumer pays. This does not mean that the distributor is a heartless profiteer. Taken by and large the retailer's profit is not great. The indefensibly high prices of today are the result of inefficient production and inefficient distribution. The difference between what prices are today and what they might be is not so much pocketed by producers and distributors as it is wasted."[4]

The Joint Commission of Agricultural Inquiry of the Senate and House in 1922 after voluminous research, came to the conclusion that approximately 50 cents of the dollar the consumer pays for bread is absorbed in the cost of distribution.

On the New York City food situation, Mr. Frederick C. Howe has stated: ". . . Middlemen have arbitrarily crowded themselves into the field and taken from 50 to 65 cents out of every dollar paid for much of the food of the metropolis. The waste from the operations of their agencies is estimated at from $150,000,000 to $200,000,000 a year, according to the second annual report of the Department of Foods and Markets."[5]

On the whole such estimates as we have seen indicate that for every man producing there is another distributing. To arrive at this ratio, however, we must include with distribution the man-power devoted to competitive salesmanship and the overhead trades generally, and the man-power of farmers and factory workers who are supplying equipment to the distribution and overhead traffic. In these premises money values for once really constitute a

helpful medium of analysis. It is almost impossible to pick out the steel worker who is making material for milk delivery trucks as against his brother who is making girders for a boot and shoe factory. But if we take the consumer's dollar, and deduct from it the number of cents which the producer receives, the margin represents a spread which includes not only distribution in the physical sense, but all allied charges as well. Insofar as the farmer or factory worker, or advertiser, or service bureau has done work for the distributor, the distributor passes the charges on, or tries to, and his margin—though not necessarily his profit—is by so much the greater.

Mr. Hoover in his report as Secretary of Commerce for 1924, summarizes the wastes in distribution under seven main heads:

1. The loss due to unnecessary purchase and sales transactions—too many links in the chain from producer to consumer.
2. The waste in transporting inferior and unsaleable products. (Preventable in part by local grading at the shipping point. Fifty per cent of all pineapples landing in New York City are thrown away uneaten.)
3. Decay arising from delay and repeated handling.
4. Inadequate marketing facilities, including both cars and terminals. Blind consignments and cross hauls in search of consumers.
5. Uncontrolled distribution. Local gluts and famines with consequent destructive fluctuations in price levels and stimulation of speculation.
6. Destruction of agricultural capital itself through discouragement of farmers due to temporary "over-production" and low prices.
7. The waste due to speculation and hazards in distribution flowing from the above causes, necessitating un-

duly high margins to cover the risk. In other words, the producer and distributor make every effort to load the current price to insure themselves against future losses.

With no co-ordination between requirements and output, the problem takes on the general outlines of a game of poker.

The report of the Joint Commission of Agricultural Inquiry

The Joint Commission has prepared a comprehensive summary of wastes in the distribution of farm products. It finds primarily that large amounts of farm and food products are now moved in advance of requirements, with no knowledge of whether they can be absorbed. This lack of information in respect to the amount of food which the people of a given area normally demand and consume, makes for untold waste. There is no budget, no balance; the rule is hit and miss. Under such conditions the Commission finds—as one would expect—that neither wholesalers nor retailers are making much money on the average; in fact, profits seem to be tending towards narrower and narrower margins.

The Commission notes the grave need of standardization in crop production, in grading, weighing and in containers.

It finds that wholesale markets are largely a haphazard growth sponsored by individual initiative, and as a result are "usually congested and poorly situated with reference to convenience and economy." The lack of properly established *joint* terminal markets is responsible for many extravagant costs. In certain food lines, the farmer's crop capacities exceed the existing wholesale market facilities to absorb the crop, with the inevitable result of congestion, dumping, blind shipments and consignments sold for freight

charges. Meanwhile a systematic use of warehouses to absorb temporary surpluses is urgently needed.

Lastly the Commission reviews sales policies. What has the modern high pressure salesman done for the marketing of foodstuffs? By and large he has made confusion worse confounded. Each marketing concern seeks its outlet according to its own theories and in competition with all other concerns making similar efforts. The result has been a growing methodology of sales *forcing*. New agencies, new schemes, new brands, new systems of rebates, and above all new operating costs, have been added by one company after another in their effort to keep up with their competitors, and to maintain a continuous flow of goods. Advertising of course, has been looked upon as the spear head of the sales-forcing drive. On the part of manufacturers of food stuffs, this has frequently meant "national advertising," and the Commission finds "a tendency on the part of the manufacturer and wholesaler to undertake distribution over a larger territory than can be economically served." Agents have been put into the field to compel retailers to force the manufacturer's goods. In consequence, retailers have often ceased to fulfill their public function of helping the consumer get what he wants, and have turned rather into high pressure forcing bureaus for the goods of specific manufacturers—thus "ceasing to be an economic factor in the community which the retailer serves." Yet "manufacturer after manufacturer has repeated this process until the public and the retailer are confronted by a confusing urge to buy more products in constantly increasing variety. Buying habits are upset and consumers cease to give their patronage to individual merchants, and scatter their buying not only within the community but make purchases outside of it. To overcome this, retailers devise new and expensive schemes."

By virtue of sales forcing, manufacturers, the Commission finds, have overloaded wholesalers and retailers with excessive stacks of idle merchandise.

We are prepared to admit that in this competitive scramble certain products of outstanding excellence standardize themselves on the merchant's shelves, and thus make it easier for the consumer to get what he wants in the long run. But the toll of waste is out of all proportion to the benefits realized.

Mr. J. R. Spingarn gives us a concrete case.[6] As a salesman in Texas he discovered a mechanic who received, when he worked, $6 a day. This mechanic had contracted to pay $30 a month per installment contract for a second-hand automobile, $30 a month per installment contract for a set of plush and fumed oak parlor furniture, and other sums per installment contract for a piano, a gold watch, a baby carriage, and a diamond ring. The total of his contracts—all duly recorded as "sales" on the books of the several vendors, all duly added to the commission accounts of the several up and coming salesmen—came to more than the mechanic could earn if he worked every day in the month! And it was after a drought in Texas that Mr. Spingarn heard a territorial sales manager rise to the dignity of a Joshua: "Drought or no drought, West Texas has got to buy its quota! Sales resistance has stiffened, has it? Well, then, we'll smash it!"

The report of the Federal Trade Commission

Perhaps the most penetrating quantitative study of wastes in distributing food products made to date in the United States is that of the Federal Trade Commission in its volume *The Wholesome Marketing of Food.* The findings are summarized in the following paragraphs.

Potatoes often "sweat" because they are not packed immediately after digging. One Chicago firm cites $100,000 of Louisiana and Mississippi potatoes rotting in transit to Chicago in 1918. Factories for converting potatoes into starch and alcohol should be located nearer the farm, as it does not pay to so treat them after heavy transportation charges have been incurred. (Another item on the side of economy is decentralization.) The spread between prices paid to farmers for eggs and that received by dealers is due in part to lack of proper treatment of eggs by the farmer—he does not eliminate *bad* eggs before shipment, he does not control "blood rings" by keeping male birds out of the chicken runs, he does not pack properly. The total loss due to bad methods in shipping eggs are set at $50,000,000 to $100,000,000 a year. When one million pounds of tobacco is packed in standardized packages, the lot can be moved in 32 freight cars; while an equal weight packed in mixed containers requires 50 cars.

From 5 to 10 per cent of all food shipped is spoiled because of delays in shipment. A carload of strawberries will lose from $5 to $10 in value per hour, for every hour of delay. Dealers in onions, cabbages, potatoes and watermelons state that a delay of two days may mean a shrinkage in value as great as $100 per car. Methods in caring for fowl in transportation are not only cruel to the live birds, but account for large preventable losses. Much of this delay is caused by transfers from one railroad system to another. Dealers report that under the unified rule of the Railroad Administration during the war, car shortages and unnecessary delays were markedly reduced.

Storage facilities are inadequate at most shipping points, causing foods, and particularly fruits, to be left out to freeze and spoil. Freight cars with proper refrigeration

and ventilation are scarce. There is discrimination in the allotment of cars, a discrimination which often leaves the small producer high and dry with no means for marketing his goods. One Wisconsin firm lost $40,000 of potatoes in 1917 due to failure to get cars. Overloading cars is responsible for large losses, especially in the case of soft fruits. Minimum weight for carload shipments is so high that conformity to the rules requires jamming of the fruit, and so top layers usually arrive at their destination spoiled —the effects of the refrigeration cannot reach them. As steamship owners are protected against damage claims by the terms of the bills of lading—which railroads are not—losses of perishables in loading steamers are universally worse than in loading railroad cars. One New York fruit broker asserts that hardly a boat comes into the harbor "without the occurrence of thousands of dollars' worth of unnecessary damage in unloading." Fruit loaded on top of sugar averages a 50 per cent spoilage factor due to the heat generated by the sugar. Yet the Commission found evidence of such mixed shipments. Cork loaded over onions—thus cutting off ventilation—caused the spoilage of 40,000 crates of onions.

Nine railroads and 45 steamship lines bring food to New York. As a result of competition for location of terminals, food products are not delivered to best advantage, resulting in excessive delivery expenses, spoilage and loss. The Federal Food Board in New York stated that $1,000,000 worth of foodstuffs went to waste during January, February and March of 1918 through lack of proper facilities for handling. In January, 8,000,000 pounds of potatoes, celery, cabbage and onions were dumped as spoiled, together with 9,000,000 pounds of imported foods. Millions of pounds more froze on the Brooklyn waterfront due to lack of storage facilities. One fruit dealer reported

to the Commission that enough fruit is lost in New York through negligence in handling to supply the population of a city the size of Pittsburgh!

The Retail Traffic

If the wholesale situation is generally bad, the retail situation is worse. There are 335,000 grocery stores in the country serving, on the average, 315 people or about 70 families each. In 1850, there was only one grocery store to every 960 people. There are in addition approximately 37,000 hardware stores, 50,000 drug stores, 35,000 dry goods stores, 142,000 boot and shoe stores (one to every 170 families), 40,000 men's furnishing stores, 100,000 automobile accessory and repair establishments, and 150,000 general stores. Of the grocery stores only 33,000—or one in ten—are rated at $5,000 or better, while 150,000 have no credit rating whatever. In New York City there is one food dealer for every 74 people. In Madison, Wisconsin, there is one grocery store for every 280 people, and in the survey which established this figure, it was found that 8 out of the 36 stores which had any real accounting methods were operating at a loss.

By and large, there is some kind of a retail store—not including automobile establishments—for every 25 families in the country.[7]

Grocery stores	335,000
"General" stores	150,000
Boot and shoe stores	142,000
Drug stores	50,000
Men's furnishing stores	40,000
Hardware stores	37,000
Dry goods stores	35,000
Department stores	5,000
Total	794,000

Dividing this total into the 20,000,000 families in the country, the average works out to just over 25 families per store.

Mr. E. A. Filene, in a separate calculation, estimates a retail store to every 26 families—a reasonably close check.[8] Mr. Filene adds furthermore that *two-thirds* of all the expense of running these stores is loss and waste—an "excess charge on the community." In other words, for each necessary store, there are two superfluous ones.

> "The retail trade as conducted on this plan of self-help and equal opportunity has the stocks, equipment and man-power which will unavoidably exceed what is required for the work by some 200 to 1,000 per cent. . . . The retail trade always and everywhere is something like three-quarters to nine-tenths idle waste, to be cancelled out of the communities' working efficiency as lag, leak and friction." [9]

Veblen's estimate in the above quotation is a higher one than Filene's but he cites it as founded on certain figures collected by the Statistical Division of the Food Administration in 1918—figures as yet unpublished.

From the standpoint of the functional society, it is probable that at least two-thirds of all the effort expended in retail trade, is wasted effort. This includes not only the man-power of the storekeepers themselves, but the man-power engaged in building, maintaining, and supplying (with goods other than marketable merchandise) the traffic. Of all the cases of excess plant capacity we have to note, the excess plant in the retail marketing structure is by far the worst example. Shop after shop along Main Street, selling the same lines of goods, competing for the same customers—each with a separate sales force to maintain, separate furnishings and fixtures to install, separate bookkeepers and stenographers, separate legal services, separate

delivery systems, separate advertising, separate repairs, separate reserves of surplus stocks, separate overhead generally. The result: a terrific margin of duplication, a crushing burden of overhead costs per dollar of sales, low profits, and a steady procession of bankruptcies.

The department store, the chain store, and the mail order house have all made valiant attempts to reduce this appalling margin of waste, but their inroads to date have not been great when compared with the gross volume of the whole retail traffic. And against such inroads the retail merchants have launched a costly advertising campaign urging the consumer to "Patronize Your Neighborhood Store."

In the old days when the shopkeeper was either the maker of his wares, or the agent of a specialized handicraft producer, there was much to be said for the personal contact between seller and buyer, and considerable scope for the consumer to exert his individual preferences by going to one shop as against another. Today, with nearly all retail stores carrying nationally advertised goods, with standardization becoming increasingly a factor, there is no sense or reason in this chaos of competing retailers. Modern retail shopping, says Reeve, should be conducted in large centrally located department stores, monopolizing the trade of the district and selling the same goods at the same prices as every other store in the region.[2] Such a plan, while obviously inapplicable for all varieties of retail trade—(a certain number of specialty shops will always be essential)—would enormously reduce the cost of all standard foodstuffs, household supplies and other prime necessities. In villages, of course, a single central store would have to continue serving a relatively few families—but in the towns and cities, the potentiality of waste elimination in the retail establishment is almost unlimited.

The Distribution of Milk

Milk distribution has long served as the classical example of waste in retail delivery. The essence of the case is again competition. A half-dozen wagons from a half-dozen different milk companies will be seen solemnly moving up the same street at 6 o'clock in the morning. Each wagon is but partly loaded, yet each has its motive power in the shape of horse or motor, its human equipment in the shape of driver and delivery man (sometimes combined). The wagons duplicate the same course through the streets; while one delivery man with a tray partly filled with bottles, follows the next delivery man up and down the same flight of steps. One wagon fully loaded, one motor, one delivery man with a full tray, could serve the whole street in only a little more time than it now takes the entire outfit to do it. The waste is not 6 to 1 of course, but it may run 3 or 4 to 1.

In the Rochester Milk Survey of 1912, it was found that the milk wagons in use traveled a combined total of 447 miles a day, where a unified delivery system would have required only 39.1 miles—or 9 per cent of the competitive total. In one section, 273 homes were supplied by 27 distributors traveling 25 miles, whereas one dealer could render the same service traveling not more than 2.6 miles. The survey concluded with the statement that the City of Rochester under a unified system of milk distribution could be served at one-third the current cost, saving consumers half a million dollars, or a possible reduction in price of about 2 cents a quart. Another survey conducted by the Common Council of Rochester in 1919 came to substantially the same conclusions—a possible saving of $585,000 annually, or about 2 cents per quart. The total number of milk dealers was 173 in 1912, and 136 in 1919. Surveys in

other cities have revealed a situation substantially similar. Not only is the individual dealer handicapped by the partial loading and excessive mileage of his wagons, but, due to the pressure of competition, his expense sheets are burdened with advertising outlays, salesmen, solicitors, printed matter—all expended in an effort to hold or increase his business.

While the house to house distribution of milk stands in a class by itself and has been the subject of many factual surveys, one wonders what similar studies would reveal in the matter of department store deliveries and deliveries of provisions and ice. What percentage of this traffic is carried on in partially loaded wagons, duplicating one another's movements along the same block, and what is the net effect of it on the consumer's dollar?

Transportation Wastes—Cross Hauling

It is fifteen years and more ago since Brandeis startled the country with the statement that the railroads were wasting a million dollars a day. Under the heading of Co-ordination in Chapter X, we have considered certain broad aspects of this waste, particularly as applied to terminal facilities. Under the heading of Superpower, in the next chapter, we shall deal briefly with transportation losses arising through failure properly to utilize coal and water power. All transportation of freight is in a sense an element of distribution, and all might logically be handled in this chapter. The subject is so vast, however, and it locks into so many other categories, that we have elected to treat here only the general phenomenon of the cross hauling of goods—the failure, in moving articles from producer A to consumer B, to put into practice the principle that a straight line is the shortest distance between two points.

The Port Authority of the City of New York tells us of a tank car of linseed oil routed from Undercliff to Bayonne, New Jersey, a distance of 13.5 miles. To keep its freight revenue in the clutches of one railroad, the car actually traveled 179.5 miles in going from Undercliff to Bayonne, and took four days in transit. Another car bound from Undercliff to Keansburg, a distance of 42 miles by direct rail, traveled 187.5 miles in reaching its destination.[10]

During the war the Fuel Administration saved 160,000,000 car miles by "zoning" coal, that is by making deliveries to consumers from the nearest mine.[11] England by the same unified procedure, saved 700,000,000 ton miles.[2] With the return of normalcy, these savings collapsed. The Geological Survey in 1921 reported a great amount of uneconomic haulage. Harlem County, Kentucky, lump coal moves into western Kentucky, Indiana, Illinois and Ohio, passing mines in these states producing coal of an identical quality. The transportation rate from southern West Virginia to ports on the Great Lakes is only 25 cents more per ton than the Ohio rate—yet the distance is twice as great. The rate was established to allow West Virginia coal to compete with Ohio coal, but the result has been an overdevelopment of West Virginia mines at the expense of Ohio mines, while forcing a haul twice as long as the straight line or zoning principle demands. Equal grades are solemnly moved from Illinois mines to be sold in Ohio, and from Ohio mines to be sold in Illinois. In 1920 after the hand of the Fuel Administration was relaxed, army coal costing $2.80 at the mine passed through the hands of four jobbers, and was routed all over the map before the army secured it at a cost of $11. Selling coal on the "spot" market system, makes for speculation and cross hauling. "Coal cars move into Chicago and out, and back to Chicago again, like dice in a gambling game." Coal from Illi-

nois, Pennsylvania and Indiana is sold in twenty states, many of them coal producing states.

Messrs. Gilbert and Pogue make the further point that not only is coal cross hauled, but much *direct* haulage represents loss.[12] The movement of coal is highly seasonal, with a slump in the summer and heavy congestion in the winter. When freight traffic is blocked, it is coal which usually blocks it. One-third of all tonnage carried on our railroads is coal. By concentrating coal energy in large central power stations located near the mines and feeding that energy out through transmission lines and gas pipes, an immense burden might be taken from the railroads, untold ton miles of haulage saved, and seasonal congestion averted in great part.

Coal provides the classical example of cross hauling, but it is by no means the only example. The whole philosophy of a privately owned railroad is to divert the maximum freight traffic over its own lines, regardless if the route be straight, looped like a letter S or oriented around a circle. Only 5 per cent of the food consumed in New York City is supplied by New York State farmers.[13] Kangaroo hides travel from Australia to Lynn, Mass., are made up into shoes which only Australians will wear, and are shipped back the 12,000 miles to Melbourne.

The Massachusetts Commissioner of Agriculture reports for the Boston market "the arrival of eggs from China, peaches from Africa, various fruits and vegetables from Argentina, and iceberg lettuce shipped 3,000 miles across the continent from the Imperial valley in California." Yet as he points out nearly all these products are grown or can be grown in New England.[14] Mr. Walter N. Polakov cites the case of the brass industry. "Brass manufacturing is centered in Connecticut towns like Waterbury and Ansonia. Essential copper is shipped to these places from

Arizona after it is smelted and refined in New Jersey. Then it is manufactured into hardware and shipped in enormous quantities to automobile factories in Michigan and elsewhere. All this shipping and transshipping puts a useless burden on the railroads and adds unnecessary cost to the goods."

In an earlier section we have noted the fact of how nationally advertised products in their competitive scramble to secure nationwide distribution often eat up in transportation charges what might be saved by lower unit factory costs. Cross hauling, like so many other examples of waste with which we have to deal, is linked fast to the whole problem of industrial co-ordination. When a functional industrial control began to emerge during the war, cross hauling began to abate. Inevitably such a society must think of distribution in direct routes, so far as may be, from producer to consumer. Current economic practice often holds out additional profit to some toll taker along the line of march, thus warping and looping and twisting the zoning principle—which is the low cost, wasteless, principle. An observer in an aeroplane trying to trace the movement of goods from producer A to consumer B under the prevailing régime would soon, we suspect, signal his pilot to take him down before his eyes became permanently crossed and his neck incurably twisted.

Again Community Planning

There are two main aspects of waste in distribution and they follow the same pattern outlined in the analysis of production. Granting the present location of population and industrial plant, there is waste in the technique of handling wholesale markets and terminals, in retail store duplication, in milk distribution, in cross hauling, in excessive competition, and overhead burden generally. But

this margin of loss pales before the conception of what might be saved if population and plant were relocated and regrouped according to the principles of community planning. If the United States was divided into national geographic regions—an Appalachian region, a lower Mississippi region, a Pacific coastal region—with the specific purpose of securing from each home area the maximum of home subsistence in terms of food, building materials, textiles; exchanging with other regions and with world markets only those products which were not economically adapted to production in the home territory, it might well appear in the words of Clarence S. Stein of the New York Bureau of Housing and Regional Planning, that "most current transportation is unnecessary." Motor trucks operating on a short haul basis would be the chief medium of carriage within each local area, and the long haul rail and water traffic supplying only necessary inter-regional exchanges, would fall to a small fraction of the present load. We are willing to admit, however, that community planning on any such basis of wholesale common sense, is almost too Utopian for consideration even in these pages. It presses functionalism a good deal farther than even the war control contemplated. Before its boundaries, even the national advertiser would have to bow.

A Summary

Man-power wasted through current methods of distribution cannot be calculated. A minimum might be estimated on the basis of the retail store traffic alone. There are 3,600,000 workers engaged directly in retail selling. There are probably half as many more engaged indirectly in the whole structure—builders, bookkeepers, printers, advertisers, supply workers, delivery boys, furniture and equipment makers. Say a total of at least 5,000,000, direct

and indirect. On the basis of the excess capacity figures previously quoted—from 300 per cent up—it is not unreasonable to suppose that an efficient organization of retail selling would eliminate a third to a half this total man-power. Mr. Filene says two-thirds. Would we be far wrong in estimating that there is a waste of not less than 2,000,000 workers in this, the major branch of distribution? On the basis of Mr. Filene's ratios, the waste would be over 3,000,000 man-power. Mr. Hoover, speaking before the First Distribution Conference of the United States Chamber of Commerce, outlined the main channels of waste in distribution with this significant conclusion: "I wish to make it clear that in speaking of waste I do not mean waste in the sense of willful waste, but economic waste which is the natural outgrowth of the competitive system. I do not mean the waste that any single individual can correct of his own initiative, but waste that can only find remedy in collective action." Until distribution is handled as a regional and national synthesis, untold man-power will continue to use up untold energy, accomplishing precisely nothing.

Twenty Million Cook Stoves

Wastes in household economy come *after* distribution has laid its products at the consumer's door, and thus after the economic flow is theoretically done with them. How the householder uses the goods he gets, is his own affair. But the home still remains an economic world in microcosm—except for most American homes it is a communistic rather than a capitalistic economy. There is no internal price system; mother does not charge for frying eggs, nor father for shaking down the furnace. Goods come into this world in the shape of household raw material, but before they are finally consumed, many pass through additional

stages of manufacture. They are peeled, sliced, boiled, roasted; they are distilled and preserved, they are cut and sewn; they are burned in boilers and grates and ranges; they are hammered and shaped. . . . This internal manufacturing is greatly reduced from great-grandmother's time, but it still claims a 12 to 15-hour day from some 18,000,000 housewives—and a good, long working day from some 2,000,000 household servants. It is thus by far the biggest single industry in the country. In the aggregate it requires an enormous industrial plant—furnaces, boilers, ranges, heaters, laundry tubs, washing appliances, cleaning apparatus. Every house thus contains within itself certain capital goods to turn raw materials into end products for final consumption.

There have not been many household engineers to date. This great industry has not received the critical review already meted out to coal, textiles, boots and shoes, wholesale markets. It has not been entirely neglected—Mrs. Christine Frederick and others have time-studied and measured somewhat—but it is yet to be overhauled in a thoroughgoing way. From the preliminary skirmishes it would seem that the possibilities of waste elimination would surpass even those to be found in the retail store traffic! It takes no investigation to realize the factor of duplication involved—20,000,000 cook stoves, 20,000,000 hand laundries, 10,000,000 furnaces—all without exception profoundly wasteful of coal, oil, gas and supplies. It is impossible to burn coal in such small units and get any appreciable thermal energy out of it. How far the family as an organic social unit, demands this waste, and how far domestic manufacturing might be unified and organized without damage to the biological unit, is a problem inadequately explored. We recommend it to an aspiring doctor of philosophy.

Miss Hildegarde Kneeland, of the Bureau of Home Economics in the Department of Agriculture, outlines the main wastes in domestic economy as follows:

1. Excess capacity and duplication of equipment. Laundry equipment only used once a week for instance.
2. Inefficient equipment—due to small production units.
3. Mishandling of equipment—due to untrained workers—particularly household servants.
4. Waste of fuel and supplies—due to small units and untrained management.
5. Inefficient delivery of household supplies—in milk, groceries, ice, etc. (as we have already noted.)
6. Inefficient purchasing of supplies—due to lack of standards and training for consumers, adulteration, proliferation of retail stores, etc.
7. Elaboration of standards—service plates, table layout, ball tassels, starch, silver, linen and china—all the useless paraphernalia, involving untold extra cleaning and care which "nice" people demand. (*C.f.* Veblen's theory of conspicuous consumption.)
8. Inefficient cleaning methods. Little is known concerning the relation between cleaning processes and health. It is now largely a matter of ritual, especially in dusting and polishing. Typical house construction greatly increases the labor of cleaning.
9. Maladjustment between work and individual aptitudes of household workers. Square pegs in round holes. Assumed that all women are born housekeepers; an assumption so unwarranted as to lead to untold friction and waste.

Specific data is lacking for measuring any of these items of loss and leakage, but in the aggregate they must be very considerable, and to a certain extent preventable.

CHAPTER XII

NATURAL RESOURCES—THE GUTTING OF A CONTINENT

Wealth, in the terms of immemorial economic usage, is derived from labor applied to land. Nearly everything except personal service which we consume is the result of raw material fashioned and shaped by human energy, or by machines which human energy have created. We have seen in the foregoing chapters something of the waste of energy, and it remains to inquire into the waste of land—land in the broad economic sense of all natural resources; minerals in the ground, forest and animal life above the ground, fish in the seas, soils, streams.

What we do here is but to run a rough chain and compass line over the findings of conservation movement—a movement still a living force, but somehow strangely shrunken from the great days when Roosevelt was its King Arthur and Pinchot its Launcelot. That high adventure into waste has had its enduring results, lances have been shattered and foemen unhorsed, but on the whole the embattled front of sturdy individualism has not been broken. One lumber king or one coal baron is still good for any ten conservationists. The day of the pioneer may have passed its noon, but it still runs strong.

It is not difficult to draw a very gloomy picture of the despoilation of a continent. The rape has been colossal and unparalleled in history. More difficult is the attempt to appraise the real economics involved, for, on analysis, the simple dramatic sequence breaks down into many baf-

fling and confusing parts. If an Industrial General Staff had been written into the American Constitution, with power to control natural resources in the public interest, enormous waste might have been averted, but the drive of the pioneers westward would have been altogether a different, and one fears, a tamer, phenomenon. It is doubtful if the arts of invention would have progressed as rapidly. The prospector, the speculator, the plunger, and the stark individualist have been woven into the whole fabric of the American scene. Furthermore the history of the material conquest of America largely parallels the history of every other rich and virgin area—Canada, Australia, South Africa. The momentum of such a conquest is impossible without waste—enormous waste—and it may be that the philosophy which was earlier applied to standardization in general is roughly applicable here. . . . Free experimentation, proliferation, trial and error; then as the stable forms emerge from chaos, order and standards. Human nature being what it is, how can those farmers be censored who, with the back-breaking struggle of clearing a wilderness already upon their shoulders, found at least some surcease in using the richest soils available without bothering to refertilize? . . . Those early miners who tapped the richest veins of coal as the easiest to move and sell, without thought for the equal tonnage which their raw methods left forever unreclaimable underground; those lumberjacks (winter lumbering is no job for academic philosophers) who took the nearest and the biggest trees, and left the slash to burn as jolly good riddance; those hunters who slew bison and bird and lynx as their stomachs and their safety prompted . . . is it more than you or I would have done?

But somewhere this mad dance of destruction must abate. Pioneering does not last forever, and the eye with which we regard its early destructiveness cannot remain continu-

ously charitable. When the westward flow of emigration reached the Pacific and began to turn backward on itself—say by the last decades of the 19th century—the pioneer had lived his course, and it was time for organized civilization to take a hand. The conservation movement was thus hardly before its time. It was an attempt to introduce order into chaos.

So far as human energy is concerned, it is probable that "skimming the cream" from coal and timber and oil has taken rather less effort to date, than would have been required had conservation been inaugurated with the Constitution. We have, here and there, actually saved some man-power by wasting raw material. This is a policy, however, which has its distinct limitations, and builds up meanwhile, as we shall see, an ever more serious bill of damages against the labor power of the future.

Of course, it is conceivable that tomorrow or next day some new invention may revolutionize the whole case against waste in this category. If we could suddenly get unlimited cheap power out of the winds or out of the tides, the tears shed for devastated deposits of coal, oil and natural gas would be largely maudlin ones—though the problem of by-products other than power would still remain. Similarly cheap nitrogen from the air would cause us to forget the ravages of the soil. Just what are we to do for timber, however? . . . Invention, we are ready to admit may knock the bottom out of much of the case for wasted raw materials—but such inventions are still in the womb of time, and to date the indictment stands.

There seems to be a fairly clean-cut distinction between those natural resources which, once used, are gone forever; and those which may be revived through more careful methods of exploitation. In the first class fall such inorganic substances as coal, oil, natural gas, mineral deposits,

marble quarries, and so forth; in the second, organic substances like forests, crop handling, fur-bearing animals, fisheries, and the like. Water power stands somewhat in a class by itself; it is a potential resource, the technique for whose development is fully known, and waste arises because this technique is not applied.

The historic course has been roughly sketched by Veblen: "First among the natural resources to fall under the American plan were the fur-bearing animals. Business enterprise has run through that range with exemplary thoroughness and expedition and has left the place of it bare. It is a neat, compact and concluded chapter of business enterprise. . . . Aside from agriculture, the progressive seizure of natural resources and their conversion to private gain, falls under several main heads somewhat as follows—gold, silver, timber, coal, iron and other useful metals, petroleum, natural gas, water power, irrigation, transportation (as waterfront rights of way, and terminal facilities)." [1]

We will not attempt to follow the historic development, interesting as such a treatment might prove. Space compels us to outline barely enough the outstanding wastes of inorganic natural resources, including not only the methods of exploitation, but some consideration of their utilization; followed by a similar treatment for organic resources.

Inorganic Resources

"The world has used more of its mineral resources in the last 21 years than in all preceding history. The per capita consumption of minerals has increased sevenfold since 1900. While we have not mined 2 per cent of our original supply of coal in the United States, we have exhausted 33 per cent of our high grade beds. There are only limited reserves of low volatile smokeless coals, and high volatile gas coals are being rapidly exhausted. We

have huge reserves of iron ores, but the high grade deposits 'have the possibility of being exhausted at a comparatively early date.' It is probable that if 'business were to catch its stride through the whole world, and normal advances were to be made, we would see the practical end of copper mining in the United States within the present generation.' Of oil, there remains in the ground (in 1921) about 9,000,000,000 barrels, or 'only enough to satisfy our present requirements for 20 years.' Meanwhile requirements, particularly for motor trucks, oil burning ships, and aeroplanes, are on the increase. We have exhausted more of our oil reserves since August, 1914, than in all previous years! The peak of natural gas production has been passed, the supply diminishes, and so the chapter of this 'wonder fuel' draws to its close." In the above words, Floyd W. Parsons, editor of the *Gas Age Record,* sums up the situation in respect to the major inorganic natural resources.[2] Messrs. Gilbert and Pogue are equally explicit: "For every ton of coal produced, our methods of mining have placed a second ton beyond recovery; for every 1,000 feet of natural gas turned out, a similar quantity has escaped (into the air); for every barrel of petroleum that has seen useful service, nine barrels have been wasted . . . our best and most convenient coals will be depleted in a few decades, half our petroleum is already used up, and over half our natural gas is gone."[3]

Coal

Anthracite or hard coal need not detain us. These beds are an older branch of the coal family; time and pressure have taken from them the oils and the tars, the gases and the chemicals which give soft coal its peculiar value. Furthermore, the anthracite monopoly, however much it may have wasted the householder's money in high prices,

has organized the engineering of the industry, along reasonably efficient lines.

The total production of soft coal in the United States runs around 550,000,000 tons a year. No monopoly governs it; the winds of free competition blow through it; and it is, in the words of C. E. Lesher, "as unorganized as the retail grocery business." To mine the tonnage takes the labor of 600,000 men, but, as we have seen in earlier chapters these men are idle, on the average, one-third of every year. We have also seen how one mine in every three should not have been opened; how the industry has a tonnage capacity from 40 to 50 per cent in excess of annual coal requirements. Of the amount produced, approximately 60,000,000 tons goes to the making of coke and other by-products; 150,000,000 tons is used by the railroads to drive their engines, 50,000,000 tons is used for power generation in public utility plants, while the balance goes into power and heat for factories, and into house heating.

Beyond the wastes of excess capacity and idle man-power, which we have considered elsewhere, how, specifically, is the coal itself wasted; what technical procedure would give us equal energy and equal by-products, and save tonnage at the same time—tonnage which future generations may bitterly need? There are three main sources of preventable tonnage loss:

1. Bad technical methods underground.
2. Bad technical methods in steam-raising and heating.
3. Failure to link coal and water power into regional super power systems.

And, perhaps even more serious still, is the failure to salvage by-products. Untold riches in fertilizers, dyestuffs, chemicals are allowed to go up in smoke—their only function to increase the ugliness, the ill health, and laundry

bills of our cities. The smoke nuisance is thus a knife with a double edge—we waste power, heat, and by-products, in order to waste health, beauty, and cleanliness. Thus while a straight loss in tonnage is more serious from the point of view of our children, than from our own, the failure to utilize smoke, deprives us of a great increase in wealth here and now, besides casting dinginess and gloom over all our industrial civilization.

Underground

Mr. Hugh Archbald after long experience as a mining engineer, concludes that for every ton of coal brought to the surface, another ton is needlessly left in the mines; and that—if the technical arts of mining were fully utilized—one man, with no more effort, could do the work of four.[4] Generally speaking, the underground layout is unplanned. A small mine has as many roads and turnings as a city of 25,000 people. All these roads are in pitch darkness, except when the miner comes along with the lamp in his cap. The mine will average one foreman to every one hundred workers. These workers may be strung along a mile or two of inky blackness. Once in a while "Mister Super" drifts along and keeps them in touch with the rest of their black world. Mostly the miner works without direction, without co-ordination, blindly, alone. Any industrial engineer can foretell the result of work so planned—so hopelessly *unplanned.* Slight supervision, loose organization, poor morale, mean tremendous inefficiency in winning the coal—the whole made worse by periodic layoffs and shutdowns. Meanwhile the accident rate per ton is three times the British rate, and hardly a month goes by without its mining holocaust.

The governing policy of working the big seams—"skimming the cream"—destroys the thinner seam in the process.

Gilbert and Pogue conclude: "The tonnage of thin seam and high cost areas sacrificed in the process amounts to more than half the total coal produced to date."[3] Leasing systems often obligate a company to remove a given tonnage each year, irrespective of demand or price, thus forcing exploitation of the richest seams. The fixing of wages on a thick seam basis has operated against an improved technique. A miner in John Brophy's union district writes: "I see every day in the mine where thousands of tons of coal are lost just because the operator couldn't make the profits on it that he could in other parts of the mine, so he draws the pillars and brings the mountain in and leaves tons of the best kind of coal to go to waste. Coal is taken out where they can make the largest profit and the rest is lost forever."

Floyd W. Parsons tells of the 500 competing companies in the Central Pennsylvania fields, "when in the interests of efficiency not over 10 to 15 companies—with central power and pumping stations—should be operating in large units."

Coal mining is not the careful exploitation of a limited natural resource with a view to scraping the platter clean as the exploitation progresses; it is a furious and chaotic enterprise in competitive salesmanship with a view to catching the market today, and let tomorrow take care of itself. In a way, it is like a retailer selling his best stock at cut prices in order to meet a note at the bank, with no thought of how the rest of the stock is to be some day moved. There are technical methods for careful mining—the long wall method, for instance, that takes all the coal which can be taken; but American practice, governed by the hope of quick profits—or, what is more common, the hope of averting losses—clings to the antiquated room and pillar method, with its great margin of waste.

George Otis Smith, of the Geological Survey, after an

exhaustive quantitative study of the existing coal reserve, concludes that the tonnage remaining in the great producing fields of the East is "so limited as to compel us to foresee their exhaustion." The Pittsburgh bed in Pennsylvania was thought good for 30 generations. It will probably last only a single generation. The "Big Vein" in Georges Creek, Maryland, was thought good for 150 years. It is almost worked out.[3] There is coal of sorts in the ground for hundreds of years to come—but unfortunately coal, like laundry work, is not all of one grade; there is good coal and bad coal. The point to be remembered is that the high grade, easily won coals are being exhausted within predictable periods—what remains will be low grade coals, or good coal, immensely difficult to mine.

Utilization—firing methods

Figures from the Geological Survey and the Bureau of Mines summarize the waste of an avêrage ton of soft coal burned in a steam boiler as follows:[3]

	Pounds	*Per Cent*
Lost in mining	600	
Lost from mine to boiler room	126	
Gases going up stack	446	
Lost by radiation	51	
Lost in ash pit	51	
Lost in converting heat into mechanical energy	650	
Total losses	1,924	96%
Final utilization	76	4%
Total tonnage	2,000	100%

Thus only 4 per cent of the original ton is finally utilized. The combined losses aggregate 96 per cent. This is, of course, the theoretical table of the exact scientist. The 650 pounds lost in converting heat into mechanical energy is true enough, but only a fraction of the loss is preventable. No man knows—perhaps no man will ever know

—how to convert heat into mechanical energy without waste.

Messrs. Huntington and Williams are somewhat less dramatic in their conclusions though it is evident that their figures substantially agree with those of the Bureau of Mines: "The waste of coal is so enormous that where one horse-power or its equivalent in heat is really used, the consumption or waste of coal underground, on the railroads, and in the furnaces, is estimated as enough to furnish at least 20 horse-power and perhaps more! Part of this is inevitable, but certainly it might be cut in half." [5]

George Otis Smith finds that the average steam plant uses eight times as much coal per unit of power generated as does the most efficient plant. That is, if the most efficient plant be given a score of 100 per cent, the average plant operates in the neighborhood of 12½ per cent effectiveness. The United States Fuel Administration pointed out in 1918, that 25 per cent of all coal was lost through bad firing methods.

Thus it is the common agreement of those who are in a position to know that if coal had no other use than that of generating power, an immense amount of that power is lost through bad technique in current firing and steam-raising practices. In other words two tons are being burned where one or less would suffice.

Utilization—by-products

But power is not the only use for coal. In four minutes Henry Ford converts a ton of bituminous into:

8,000 cubic feet of gas
10 gallons of gasoline
20 pounds of ammonium sulphate
30 gallons of crude light tar
3 gallons of creosote oil
2 gallons of crude lubricating oil
10 pounds of grease

And he has left 1,500 pounds of coke—either for steel-making or for the finest kind of smokeless fuel. His coal costs him $5 a ton delivered; the market value of the above products is $13.56.[6]

Gilbert and Pogue open this vista: "It is not beyond the bounds of reason to foresee a condition whereby a householder in the place of his ton of anthracite which he now welcomes for $11, will receive a ton of smokeless fuel without slate, a month's supply of cooking gas, 40 miles of motor fuel, enough fertilizer to start a small garden, and tar sufficient to allay the dust in front of his house—all for far less money than he now pays for inferior coal. This may appear a fanciful picture, but coal has precisely this possibility within itself." [3] Ford, as in many another field, is beginning to convert this fanciful picture into tangibly reality.

Steel-making is impossible without the coke derived from soft coal. Coke, therefore, has long been a by-product of the first importance. It is secured by burning coal in coking ovens. The old beehive oven salvages the coke, but nothing else—the gasses, the oils, the fertilizers go up in smoke. Of the 50,000,000 tons of coke produced annually in the United States about half still come from beehive ovens. Meanwhile, as has been shown in the Ford case, the technique is known and established for salvaging not only the coke, but other valuable products as well. Altogether there are upwards of a thousand different products to be secured by the destructive distillation of coal. Present methods waste most of them. Not all soft coal can be turned into by-products because it lacks the essential ingredients, but perhaps 175,000,000 tons per year should be so treated, leaving the balance for straight steam-raising or power-generating purposes.

On the basis of 500,000,000 tons output, Gilbert and

Pogue conclude that current technical knowledge is available to *double* the number of horse-power now released, and to give the nation in addition, 5,000,000 tons of ammonium sulphate (a splendid fertilizer); 1,000,000,000 gallons of benzol (a motor fuel comparable to gasoline); 4,000,000,000 gallons of tar, as well as the requisite amount of coke for steel-making. The net money loss of present practices—after allowing for the expense of installing the improved devices—is estimated by these engineers as follows:

Loss of horse-power	$1,000,000,000
Loss of ammonium sulphate	280,000,000
Loss of benzol	300,000,000
Loss of tar	100,000,000
Other losses	320,000,000
Total annual loss	$2,000,000,000

"Less than half the output can do the present work, and in addition make heavy contributions to fertilizers, motor fuels and chemical products." The nation would probably not know what to do with twice as much horse-power from coal, and so the realities of the situation—from the natural resource point of view—work down to a standard based *on less* production—perhaps half the current output—as the maximum national requirement, the balance being saved for future use. Meanwhile the late Charles P. Steinmetz—the greatest electrical engineer that America has produced—has stated that three-quarters of coal energy is wasted in present methods of utilization.

Water power

If every drop of the annual rainfall could be converted into electrical energy, the total would just about equal the present consumption of energy derived from coal in the United States.[7] Obviously only a fraction of the rainfall

can be so converted through the power of falling water in streams, and thus we have to face the plain fact that "white coal"—water power—can never act as a complete substitute for coal energy. What water power can do, is to diminish the annual amount of coal needed, and thus lengthen the life, and help to preserve the by-products, of the coal beds. Furthermore, as we pointed out in the chapter on Co-ordination, nature has favored this country in that "regions distant from sources of coal are all bountifully favored with water power." This "balanced occurrence" is susceptible to the working out of great economies in the production and distribution of energy.

Scarcely 15 per cent of the water power readily available has been developed to date; and only 7 per cent of that available if storage reservoirs were introduced.[3] From 80 to 90 per cent of the horse-power to be freely taken from falling streams thus runs to waste. Why? Because it has been cheaper to skim the cream from coal and oil, with their relatively smaller capital cost per unit of horsepower. We have been eating into our principal, while allowing a steady and unending *annuity,* in the form of water power, to waste away. Once the capital cost is over, the dams built and the turbines installed, water power yields an energy return forever, with very low operating costs. Only a few men are needed to tend the turbines. But the low cost era of skimming the cream from coal and oil draws to a close. Pioneering has landed us in the position of an improvident spendthrift who refuses an ample annuity in order to squander his inheritance.

Super power

Water power may be introduced at isolated points into the industrial system to some advantage, but the great potentiality of the savings to be made from it is only

realized through the co-ordinated planning of super power systems where coal is co-ordinated with water power. Giant power is one of the bravest and most exhilarating glimpses of Utopia which engineers and scientists have ever dreamed. It not only saves coal and oil, it electrifies the railroads, lightens the traffic burden, abolishes smoke and soot and grime, runs cheap power to the farm and the country town, makes—as Ford makes—for industrial decentralization, for less congestion in the cities, for more life and vigor in the country. One's eye follows the sweep of the great high voltage lines as they charge the hill and dip to the valley—straight and true and infinitely powerful—and for an instant one glimpses the end of meanness, poverty, disorder; a world set free!

The potential horse-power to be readily derived from water in the whole United States is 60,000,000 and, as we have seen, only about 15 per cent—or some 10,000,000—have been developed to date. Every additional horse-power saves ten tons of coal, and releases $100 worth of coal-carrying railroad equipment. Mr. F. T. Baum, in his *Super Power Atlas,* has proposed that the country be divided into twelve districts, connected by 220,000 volt transmission lines, power to be drawn from water and coal jointly on the balanced load basis—coal to be converted into energy at great central stations as near the mine as possible. Such a system he estimates would save 200,000,000 tons of coal a year; take 25 per cent of all traffic from the railroads; rid the country of smoke; and release not less than 500,000 men from the mines, railroads, and other industries to function in more directly productive pursuits. Initially, of course, the labor so saved would have to go largely into building the dams and the transmission lines for the new system. In the end it would all be pure gain.

An estimate of coal tonnage wasted

Apart from by-products, what is the approximate waste in tons of coal mined per year? We have been assured that for every ton taken out of the shaft another ton is left unreclaimable below ground. If 500,000,000 tons are taken out in a year, it follows that 500,000,000 tons are annually lost in the underground workings. Of the 500,000,000 taken out, ineffective utilization wastes at least half the tonnage. Gilbert and Pogue, for instance, have assured us that the energy content could be doubled. From which it follows that 250,000.000 tons more is wasted by reason of bad methods above ground. On the basis of Mr. Baum's super power zones, a material addition might be made to this figure, but waiving such addition as a margin of safety, it would appear that in terms of the natural resource alone, the annual bill of loss is some 750,000,000 tons. And to this we must add the tremendous tonnage of unreclaimed by-products—ammonium sulphate, gas, tar, dyestuffs and chemicals. Is it to be wondered that Mr. Hoover has termed coal the "worst-functioning industry in the country"?

Oil

George Fitch sets the stage: "An oil well is a hole in the ground about a quarter of a mile deep into which a man may put a small fortune or out of which he may take a big one. And he never knows until the hole is finished. . . . It takes a couple of thousand dollars, several months, and a couple of noncommittal men in mud-plastered overalls to dig an oil well. They begin by going up about 60 feet. When they have finished their derrick, they hang a drill on it weighing half a ton. Then the men hitch the drill to an engine and punch a 42-centimeter hole in the earth's crust. Sometimes, after they have been punching

away for several weeks, the hole blows the derrick into the sky, utterly ruining it. Then the owner shrieks with glee and employs 500 men to catch the spouting oil in barrels. But sometimes the derrick is as good as new when the hole is finished. Then the owner cusses and takes the derrick away to some other place which smells oily." [3]

And as a result: "This has been the history of almost every oil field on the American continent, a strike, a rush of speculators, a land boom, indiscriminate drilling on plots so small the derricks seem to touch one another—twelve in an area that can support barely three, no scientific provisions to conserve the gas which alone can force the flow of oil, a feverish higgledy-piggledy of cut-throat competition in the course of which anywhere from half to three-quarters of the petroleum is left in the ground and rendered forever irrecoverable." [8]

Petroleum, like coal, possesses a hideously wasteful technique for getting the product out of the ground, but unlike coal, its utilization once it gets to the pipeline, is, broadly speaking, reasonably efficient. From the pipeline on, standardization has set in, the pioneer has been barred, and the Standard Oil Company and its allies take charge of the job. There are wastes due to preventable evaporation, and wastes in securing a high gasoline content in refining, but as compared with by-product wastes in coal, these losses are relatively moderate. What petroleum gains in this field, however, is quite gorgeously made up for in winning oil from the ground. For every ton of coal produced, another ton is needlessly left in the mine; for every barrel of oil produced three barrels or more are left underground, or wasted in well operation. "Less than 25 per cent of oil in the ground reaches the pipeline." [3] The pioneer has complete charge of this process, and a marvelous mess he

has made of it to date. It is every man for himself and the devil take the hindmost. An oil strike is as exciting as a gold rush, and even more chaotic.

Meanwhile the engineer has worked out the technique for wasteless oil production, but beyond a few selected companies, nobody pays any attention to him. "With the aid of geological methods, the development of petroleum fields may be changed from a gambling venture to an exact science. Instead of representing the most uncertain venture in the world, oil production can now be made as definitely an engineering project as the mining of a clay bank." [3]

Petroleum collects in great underground pools. Over the top of the pool gathers gas—valuable gas for two reasons: it has in it many of the properties of the oil itself; and only by its pressure downward on the surface of the pool, may all the oil in the pool be driven above ground. Down to this pool, long lines of pipe are thrust by rotary drills hung from the 60-foot derrick. Each pipe is a "well." When the pipe reaches the pool, the oil and gas rush upwards—often flooding the sky with gas, the surrounding landscape with oil, and the owner with joy. Such an outburst is called a "gusher." When the gushing subsides, a steady flow may continue, ultimately falling to the point where pumping is necessary, and at last, extinction. Now the pool and the gas over it form a geological unit. To be efficiently exploited it must be treated as a unit. One engineering control should govern it, allowing only enough wells—reasonably spaced—to give the most effective outlet for oil. Care must be taken to save the gas below in order to help the oil upstairs. Gushers must be resolutely choked; seepage and water infiltration must be guarded against; in brief the known technical arts applied, and the job done aright. In this way it is possible for nearly

all the oil in the pool to reach the pipe line—and in no other way is it possible.

No such procedure takes place under the American plan. A strike is made, land is staked out, lots are bought, and feverish drilling commences. There may be ten times as many wells as the pool can efficiently support, and the wells may be placed with no consideration for efficient exploitation. Gas is not controlled; seepage is not controlled; incoming water is not controlled; gushers are not controlled—nothing is controlled but the property lines around the lots.

Which leads us to a philosophical digression. Unfortunately you cannot cut up the underlying pool into property lines, and you cannot cut up the underlying gas into property lines. These elements are anarchic—possibly willfully anarchic—but there you are. They will obey the physical laws of gravity, pressure and resistance, but they will not obey property laws. Meanwhile the ground over the pool is divided into property lots. The assumption of the law is that each man's boundary goes downward in a vertical plane, and so much of the pool as the plane bisects is his. But it isn't his, because of the aforementioned deplorable behavior of the pool. The pool will rush to the pipe which gets down first, or to certain pipes by virtue of their underground location. The owner of the lot is aware of this. So he drills as many wells as he can, as fast as he can, and preferably along the next owner's boundary line, in order to get the lion's share of the pool's activity. Thus the pioneer with his stark individualism, and his property laws which will not work with geological units, has succeeded in throwing away three barrels of oil out of four. While the engineer, who handles geological units with geological laws, could save the whole four barrels.

Take the Mexia, Texas, strike.[9] In 960 acres, 794 wells have been drilled, only 540 of which yield any oil. This is less than two acres per productive well. For proper drainage, engineers have determined that wells should not average more than one for every eight acres. There are in the Mexia field accordingly, over 300 productive wells too many for the efficient exploitation of the underlying pool. Besides the lost oil and gas due to such overdrilling, consider the lost labor power in erecting the derricks, and in drilling the unnecessary wells. Consider also the legal complications of the leases and the property lines. Finally consider the flourishing industry of selling stock based on dry holes and non-existent oil—one of the most profitable forms of quackery and fraud ever heard of. In a few years prior to 1912, Mr. A. B. Thompson estimates that no less than 425,000,000,000 cubic feet of gas were allowed to discharge unheeded into the air, in the Mid Continent oil fields alone—equalling 9,600,000 tons of oil, or 14,000,000 tons of good coal.[10] In 1913 a single well in the Cushing field blew away 1,500,000,000 cubic feet of gas.

"We have been wasteful, careless and recklessly ignorant. We have abandoned fields while a large part of the oil was still in the ground. We have allowed tremendous quantities of gas to waste in the air. We have let water into the oil sands, ruining acres that should have produced hundreds of thousands of barrels of oil." Thus the Director of the Bureau of Mines sums up the situation. And as a result of these methods, about half the underground supply of petroleum in America is gone forever, and the balance —at present rates of demand, is estimated to last only from 13 to 20 years. Gilbert and Pogue's figures show:

Mined, 1859-1920	54 barrels per capita (present population)
Underground, 1921	59 barrels per capita
1920 production	4.4 barrels per capita
59 divided by 4.4........	13 years

The total waste of the pioneer in the speculative production of oil, will run at least three times the oil produced to date. The total output has been 54 barrels for every man, woman and child in the country today. Three times this is 162 barrels per capita thrown away, or over 16,000,000,000 barrels. If this 16,000,000,000 barrels were still underground, instead of a thirteen years' future supply (more or less), we would be assured of at least a fifty years' supply.

Finally we have to note the serious factor of overproduction in oil. During 1924 hundreds of millions of barrels of crude oil went into storage while prices dropped. Production bore no relation to requirements and despite the efforts of the great monopolistic distributors, the industry went into a condition of nervous collapse. A precious fluid with only a thirteen to a twenty year life was evaporating in vast quantities, and a drug on the market. So serious was the situation that President Coolidge took official notice, and cautiously called for a conservation program. Then observe the ghastly humor of the pioneer—with the new year: "decreased production and increased consumption have changed the position of the industry almost overnight. An industry which was sick is well again. The conservation plans of Coolidge are now obsolete." [11] So prices will zig zag up until they revive another period of furious speculative drilling and production, and with surplus stocks the industry will take to its bed again.

Natural Gas

Natural gas is the history of oil over again. The Fuel Administration when it took control of the situation in 1918 summed it up: "Natural gas has been used in a most extravagant and wasteful manner with no regard to the

future, and not appreciated until it is gone." To which Gilbert and Pogue add: "The history of natural gas is an appalling record of incredible waste." [3]

Gas occurs often in connection with oil, and its economical exploitation is bound up with oil. "The lack of co-ordinated production where the two occur jointly, is responsible for a greater loss than all other causes together." As in oil, the mystical conception of vertical property lines has multiplied wells and located them awry. The engineer has been barred by the pioneer, who still persists in trying to "divide a pitcher of water with a cake knife." [3] The gas is blown off into the air by the billions of cubic feet, it is left underground, it is inadequately protected from leakage above ground, and its by-product uses are extravagant in the extreme. The Fuel Administration estimates an annual waste equal to annual production. In 1917, production amounted to 800,000,000,000 cubic feet, and is the measure accordingly of the loss. Since 1917 the output has been declining as the wells near the end of the underground supply. In 1920 production had fallen to 650,000,000,000 cubic feet. One-tenth of all the cookstoves in the country are served by natural gas, and when the day of extinction arrives, house-householders are going to wish they had been a little more active in conserving the supply. Gas made from coal is smellier, dirtier, and more costly than the natural product. Natural gas is especially suited for domestic use, but price levels are adjusted in favor of industrial use, thus uneconomically hastening the end. Twenty-six billion cubic feet are devoted annually to the manufacture of lamp black, in which the heat of combustion is entirely lost, and only a trifling percentage of the carbon content recovered, less than 1.5 pounds per 1,000 cubic feet—"an industrial perversion of the worst sort." The Fuel Administration summarily

stopped this waste during the war, but it has since returned to normal. The gas is without color or odor and the leakage factor is very great—the average annual loss per house served being 19,000 cubic feet, a loss which could be checked by the installation of measuring devices.

In short, a domestic fuel of the rarest excellence is blowing off into space at the rate of from six to eight hundred billion cubic feet a year—of which the great part could be saved by the application of technical methods already perfected.

Meanwhile Major Ernest L. Jones points out that 500,000,000 cubic feet of helium gas are going to waste annually and that no attempt is being made by the government to stop the ruin of a resource which may prove an invaluable item in the national defense, as well as providing high utilities in the industrial arts.[12] And the United States to date is the only source of helium in commercial quantities in the world.

Coal, water power, oil and natural gas—the Big Four of power—present the outstanding examples of waste in inorganic natural resources. In an age of power they are particularly vital to our survey. But they do not constitute the only losses to be reckoned with in this category. Underground methods and utilization methods in tin. copper, zinc and other metals have been subjected to much critical review.

Veblen has given us a chapter on gold—its exploitation and its uses—that is by way of being a classic.[1] From the functional viewpoint, the use of gold as a monetary reserve is a strange phenomenon. Untold man-power has gone into the mining, the refining, the transportation, the insuring and the guarding of a great and deplorably heavy mass of yellow material which rests unseen in the gloom

of one bank vault until it is time to take its weary and expensive journey to the gloom of another one. It creates a certain mystical feeling of confidence to be sure, but it is to be hoped that the ingenuity of man will some day achieve an equal confidence at the expenditure of less blind effort

Organic Resources

The waste of an organic natural resource is not so serious in the long run as that of a mineral one. Organic things will grow again if nurtured and given time. Though our forests are devastated, a constructive policy might some day bring the forests back—save only on those areas where flood and fire have carried away the underlying soil. Animal life may be revived, fisheries restocked, soils refertilized. The pioneer has perhaps more justification in this field than in that of coal and oil, but the capital cost of regrowing and restocking will ultimately be enormous. A conservation policy inaugurated even a generation ago would have done much to save the current supply, and reduce the future outlay.

Lumber

When the Pilgrims landed on Plymouth Rock there were some 800,000,000 acres of virgin forest land in the country. There remain today 138,000,000 acres. In addition there are 114,000,000 acres in second growth, saw timber size, 136,000,000 acres in second growth, cordwood size, and 81,000,000 acres of original forest land on which nothing is growing.

The total remaining stand of timber is estimated:

Saw timber	485 billion cubic feet
Cordwood	261 " " "
Total	746 " " "

Meanwhile the present rate of cutting per year is:

Saw timber	11.6	billion	cubic	feet
Cordwood	10.8	"	"	"
Total	22.4	"	"	"

In addition to this drain, there is a waste in the forest itself from fire and decay of 2,400,000,000 cubic feet. Applying the total annual drain of 24,800,000,000 cubic feet, to the present stand of 746,000,000,000 cubic feet, it is evident, that if there were no growth, our forests would be wiped out in about thirty years (37.5 years for saw wood, 22 years for cordwood). And the annual growth does not help much. On the present stand it runs about 6,000,000,000 cubic feet a year—*less than one-fourth of the annual drain.* As the stand diminishes under this 4 to 1 assault, the offset of annual growth becomes increasingly less. It would require a computation in higher mathematics to assess the future life of our forest when drain is diminished by growth and applied against current stand, but we doubt if the thirty years would lengthen to forty were the calculation made. "The central fact is that we are using up our timber four times as fast as it grows, and the end of more than three centuries of abundance is now in sight." With the above figures and comments the United States Forest Service sums up the national situation in its recent (1924) report on Wood Waste Prevention.

It is estimated that over 300,000,000 acres of the cut-over land is unsuitable for farming, and is not producing healthy second growth because of the reckless methods employed in the original exploitation. There are 81,000,000 acres—or about 10 per cent of the original stand—devastated by soil erosion and fire on which nothing of value is growing or is likely to grow—an area equal to the combined

forest lands of France, Germany, Belgium, Holland, Denmark, Switzerland, Spain and Portugal.

There is timber mining and there is timber culture—the former is the method of the pioneer, the latter of the engineer. American practice is still pioneering practice. It is possible to so cut the forests—Europe has demonstrated it—that the annual growth, if it does not equal the annual cut, is safeguarded from falling below the danger line of future annual requirements. Mr. Benton Mackaye, late of the United States Forest Service, has worked out a plan for a forest valley, with a permanent town at its center where the surrounding hillsides are cut at a rate which allows the new growth always to make good the cutting losses. The operation is thus perpetual; the forest workers have real homes and a real family life in the town—the problem of the homeless, wifeless, lumberjack is solved, together with that of an everlasting supply of timber. Such schemes find no sympathy among the pioneers who have the lumber business in hand. With their fellows in oil and coal and natural gas, they have only time to inquire, as they move on to the next location: What has posterity done for us?

Of the total annual cut, nearly 65 per cent is wasted in field and mill according to Arthur D. Little. In the yellow pine belt, the value of rosin, turpentine, alcohol, pure oil, tar, charcoal, and paper stock thrown away is three times the value of the lumber sold. Enough yellow pine is lost in milling methods, or left to rot on the ground to make double the paper tonnage in the United States.[13] Meanwhile pulpwood for paper making is imported from Norway, loaded onto freight cars, and shipped 1,000 miles inland!

Not more than one board foot of finished lumber appears for every four feet cut in the woods. Two of the four

are left in the forest, or fed into the saw mill burner or are lost in seasoning before the stage of rough seasoned lumber is reached. The third foot disappears in manufacturing. Hickory handle makers buy two tons of lumber and sell 400 pounds of handles. In many furniture factories, unskilled labor and inadequate supervision net only 30 per cent of the lumber received. The circular saw is used because it is quicker, but it leaves about three times as much sawdust on the ground as the band saw.

Of course all the wood in the tree is not economically utilizable. Beyond the leaves and the twigs and the roots, a certain amount of the stumpage would never pay for its conversion into usable products. There is a considerable margin of unavoidable waste. But there is perhaps an even greater margin which might be prevented if the pioneer gave ground to the engineer. When a tree is cut down, the lumberman hauls out in logs perhaps 80 per cent of its cubic volume. The rest is left to rot as stumps or tops awaiting the forest fire. In the mill, sawdust and slabs lop off another 40 per cent, to be burned as fuel or thrown away. Meanwhile the destructive distillation of a cord of this waste will yield:

50	bushels of charcoal
11,500	cubic feet of gas
25	gallons of tar
10	gallons of crude wood alcohol
200	pounds of acetate of lime [14]

Furthermore much of this slab is suitable for pulpwood in the process of paper making. Into the hands of eager straphangers goes 2,000 acres of forest every year, for each and every large New York newspaper. If this maw could be fed from slab wood, now discarded, many thousands of acres of standing timber could be saved—saved, who knows, for an ultimate use of an even more reward-

ing nature. Wood like coal (and coal is only decayed and compressed vegetable matter) will yield great riches in by-products; and like coal, their extraction has been very largely neglected. Mr. Little has calculated that if we applied to yellow pine the technique which the chemist has worked out, we could add to mill production—with no more cutting—40,000 tons of paper, 3,000 tons of rosin, 300,000 gallons of turpentine and 600,000 gallons of wood alcohol.[13]

That these wastes are not altogether founded on the calculations of critics, is evidenced by the statement of the Secretary of the National Lumber Manufacturers Association before a Congressional committee. This gentleman, Dr. Compton, estimates that the country is now wasting from preventable causes in excess of $500,000,000 a year in timber utilization, logging, manufacture and distribution.

Lumbering methods have played into the hands of forest fires—magnificently. In the five years from 1916 to 1920, there were 160,000 reported fires which burned over 56,000,000 acres of land, destroying $86,000,000 worth of timber, while the damage to the nitrogenous humus of the soil was probably even greater.[5] This is an average of about 10,000,000 acres a year. Besides destroying timber, soil, animal life—and often buildings, forest fires have ruined great areas for recreation purposes. The technique for their control is known, but its application advances very slowly. And as a corollary to timber mining, and the fire which, like Nemesis, follows, the slopes of the hills above the rivers are gutted, the watershed refuses to hold its water, and the streams swollen by waste, sweep down to waste and destroy the fertile fields below. In fire and flood as well as in timber and oil, the pioneer takes his toll. The Forest Service estimates a loss ratio, readily preventable, of two-ninths the annual cut, while another two-

ninths could be saved by a more thoroughgoing conservation program. Taking the first figure as a minimum, it appears that the forest waste is at least 5,000,000,000 cubic feet a year. Arthur D. Little's estimate is far greater than this—over 13,000,000,000 cubic feet—but he is careful to state that his ratio of 65 per cent of shrinkage is not all preventable.

Other Organic Wastes

The United States uses on the average 28 pounds of fertilizer per acre. Europe uses 200 pounds. This policy of starving the soil could be maintained so long as there were still new fields into which the pioneer might flow. Irrigation has stretched the margin somewhat. Edward E. Slosson shows that we are still robbing the soil of a virgin continent, but that the process cannot go on much longer.[14] Meanwhile the beehive coke ovens as we have seen release 700,000 tons of ammonium salts into the air each year, enough, in the opinion of Slosson, "to keep our land rich."

The effect of bird life on insect pests has long been known, but scientific application has not been applied. Grasshoppers, caterpillars, moths, beetles—the farmer's deadliest enemies—can be better held in check by birds than by any known human contrivance. A flock of Franklin gulls will clear a large alfalfa field of grasshoppers in a day. Yet birds have been snared, shot and butchered in region after region.

The Secretary of Commerce in his annual report for 1924, comments upon pioneering methods in coastal fisheries: "The conservation of coastal fisheries is a matter of the utmost national importance. Many are threatened with extinction." The great runs of salmon on the Atlantic coast have long since disappeared as a food supply, and

salmon on the Pacific were doomed until the Department of Commerce recently called a halt in their destruction. Sturgeon fisheries of the Great Lakes have declined 98 per cent in forty years, and the sturgeon has almost disappeared from the Atlantic coast. Since 1835, the annual catch of shad in the Potomac has dropped from 22,000,000 to 600,000 fish. In ten years the crab fisheries of the Chesapeake and Delaware rivers have been cut in half. "Our lobster catch is less than one-third of what it was thirty years ago." Pacific halibut is in process of extinction. Oil burning ships in coastal waters void their refuse to an extent which is increasingly deadly to oysters and clams as well as to fish. A self-respecting shad no longer ventures up the Hudson."

Whales are being hunted as never before, and "so great is the slaughter that unless some form of protection is immediately devised, the whale will become commercially extinct within a few years." [15]

We can take no quantitative toll of the waste in organic resources other than lumber, but these few references are perhaps enough to indicate the gravity of the loss.

By-Product Wastes

In coal, oil, natural gas and lumber, we have already pointed out the values in raw materials which are lost through failure to extract by-products. These are by no means the only cases. Whenever material of any sort is burned or thrown away, with it goes a certain number of chemical elements—oxygen, nitrogen, sulphur—in various chemical combinations, which may or may not be valuable, but which are always suspect until the chemist has reviewed them. Even homely garbage has been found to reek with riches if capital enough can be put into its renovation. It does not pay, of course, to save all—perhaps

most—discarded material. But it pays more now than it did a generation ago, and the process is accelerating. The Germans have brought it to a fine art. The invariable question to be answered is whether the salvage is worth the cost of conversion. The trouble is that while *no* must often be the individual manufacturer's answer because he cannot finance large scale renovation, the answer of the whole community is often *yes*.

We may recognize three sorts of waste in this field—the field, by the way, in which the whole modern philosophy of waste had its rise. There is loss from failure to utilize by-products proper; there is loss from failure to use a reasonably high percentage of the main product in fabrication; there is loss due to air pollution and stream pollution in the disposal of discarded material. Each of the three is serious.

Beyond the by-product wastes in the power industries noted earlier, we may point out the following. According to Professor H. E. Van Norman, president of the World's Dairy Congress, for every pound of butter that we eat, *three* pounds of milk solids are produced which are highly valuable as human food.[16] The bulk of this three pounds—save for a little buttermilk, skim milk powder, and feed for hogs and chickens—is thrown away. In 1921, of 4,300,000,000 pounds of milk solids going into the manufacture of butter and cheese, only 2,100,000,000 pounds were used for human food, or for casein.

"Our 6,000,000 ton crop of sugar contains some 12,000 tons of nitrogen, 4,000 tons of phosphoric acid and 18,000 tons of potash—all excellent fertilizers, and all lost in refining, except where waste liquors are used in irrigating beet lands. The Germans get 5,000 tons of potassium cyanide and as much ammonium sulphate from the waste liquor of

beet sugar factories. If it pays them, it ought to pay us, particularly as potash is dearer in America than in Germany.[14]

In the matter of salvaging main products as against by-products, the technical journals are full of suggestions as to how waste may be eliminated in cutting and preparing stock, in less destructive processing, in utilizing odds and ends hitherto thrown away. During the war for instance, Mr. M. F. Simmons of the General Electric Company, estimates that the national savings in scrap metal, paper, rags, wool waste, bags and cotton linters aggregated more than $1,500,000,000—though how he could place a figure on the total escapes us. We have noted earlier how an unskilled cutter will spoil $100 worth of leather a week as against a skilled cutter.

On the whole, however, this "garbage pail" aspect of waste—despite its prominence in the public mind—is, in our eyes, a minor matter. Compared with such losses as spring from the military establishment, super luxuries, unemployment, excess plant capacity, the retail store traffic, oil drilling, it is, relatively speaking, only a drop in the bucket.

More serious is stream and air pollution. Besides wasting materials, these practices put the public health in jeopardy. The Merrimac River from Manchester south is an open sewer, yet by nature one of the loveliest streams in the East. The pollution of the Ohio River by the tin-plate industry is one of the worst examples in the country, and in the opinion of A. B. Jones, heating and ventilating engineer, it is all preventable. The smoke nuisance we have already touched on. Figures which would show what the nation loses, first, by valuable chemicals blowing off into the air; and second, by the rotting of construction

work through smoke damage and by laundry bills—while they have never been calculated so far as we know, would safely stagger the imagination.

A Summary

The volume of known waste in natural resources by physical count may be recapitulated as follows:

Coal	750 million tons per year
Water power	50 million horse-power per year
Oil	1 billion barrels per year
Natural gas	600 billion cubic feet per year
Lumber	5 billion cubic feet per year
Metals	Unknown total
Soil	Unknown total
Animal life	Unknown total
By-products and raw materials lost in manufacture	Unknown total

Coal and oil figures include the tonnage unrecoverable underground. Water power probably overlaps with coal somewhat, for its greater utilization would mean less coal to be dug, and wasted accordingly. For the metals, the soils, animal life, and material losses in manufacture, we have seen no quantitative summaries, and for the last three classes we doubt if they could be prepared.

The preceding figures and comments have all been drawn from recent surveys, many of them made in 1924. In this light it cannot be said that the conservation movement for all its brave promise has much to show in net accomplishment for the generation since its birth. By and large, the pioneer and his methods remain the masters of the nation's ever declining store of natural resources.

CHAPTER XIII

THE CHALLENGE

The exploration is ended, and all the figures, so far as we have been able to gather them, are in. It remains to summarize the evidence to the extent that summarization is possible in so wide and so complicated a field. Before attempting, however, to get the threads together, it may be well to demonstrate rather explicitly why the elimination of waste is important from the point of view of the average citizen. We have assumed all along that not enough is normally turned out by way of goods and services to keep the majority of American families above the line of economic insecurity and want. We have assumed the existence of a wide margin of poverty. While to all intelligent readers, this assumption is too generally recognized to require proof, a few specific figures will help to show its extent and seriousness. It is with this dark area that the savings to be made by waste elimination, must—if they are to have any human meaning at all—be compared.

The living and the dying wage

Dr. Paul H. Douglas presented a paper before the American Economic Association in 1922 which is the most careful statistical summary of the relation of the national income in dollars to the cost of living, which we have seen. His conclusions indicate that in the year 1920 it took approximately $1,700, or $34 per week, to maintain a family on the Department of Labor's "subsistence level" budget

in the larger cities of the United States. This budget is cast in terms of the amount of food, clothing, house space and so forth necessary to keep a father, mother and three children above the line of actual want. By calculating the physical requirements set forth in the budget in terms of 1920 prices, the total of $1,700 is arrived at. In the same year it took approximately $800, or about $16 a week, to maintain a woman worker living away from home.

In 1920, there were 26,700,000 adult males gainfully employed, 6,400,000 adult women, and 5,500,000 juveniles between 15 and 20 years of age. Had these men, women and young people been paid the amount necessary to meet the subsistence level budget for each class, the total amount disbursed would have approximated $57,000,000,000.

Meanwhile the total national income in 1919, according to Dr. Mitchell and his colleagues, aggregated $66,000,000,000. In 1920 the total was reduced, due to the business depression which started in late months of the year. Professor Douglas estimates it at $60,000,000,000. From this $60,000,000,000—more or less—must first be deducted that 12 to 16 per cent which the National Bureau of Economic Research calculates as the usual amount set aside for savings; and which is reflected in new capital outlays—factories, railroads, office buildings and the like. Obviously such expenditures play no immediate part in the current requirements for food, shelter and clothing upon which the subsistence level budget is based. Subtracting then a saving of $8,000,000,000 (14 per cent on $60,000,000,000) from the national income of $60,000,000,000, and we have left for current requirements, roughly $52,000,000,000—or $5,000,000,000 *short* of the total subsistence level requirement of $57,000,000,000. "After making all allowance for the fact that the estimate of $57,000,000,000 is somewhat excessive because of the lower cost of living in agricultural

regions, and also the fact that the payment of such a wage might serve to increase the national income itself, it is probable that the margin left is altogether insufficient for:

1. Differential wages *above* the subsistence level
2. Interest on invested capital
3. Rent payments."

In other words, the national income in dollars, reduced by a 14 per cent allowance for savings, if it were distributed evenly on the subsistence level basis, would fall 5 per cent short of going around. (While the family wage is not strictly applicable to bachelor workers in the above calculation, the main conclusion cannot be seriously questioned.)

Of course, no such equal distribution, or anything approaching it, took place. Interest and rent were paid in full. Approximately 300,000 families received incomes of $10,000 a year or better—some running up into the $1,000-000 a year class.[1] Roughly speaking, the work of the National Bureau of Economic Research shows that about 5 per cent of the families in America, take 30 per cent of the national income. Thirty per cent of $52,000,000,000 is $15,000,000,000, leaving the other 95 families in 100 to get along on $37,000,000,000. This immediately operates to slam the door on any hope of the wage earners of the country averaging enough to go round in terms of the subsistence level budget, in 1920—or for that matter in any other year. For millions of people in America the annual income is, and has long been, in the words of Dr. W. F. Ogburn, not a living but a dying wage. The hundreds of specific studies that have been made of living conditions in rural as well as in urban districts only go to confirm this conclusion.

The Committee on Reconstruction of the United States Senate found, in 1921, that the building of houses for people to live in had been 56 per cent under normal for

the seven years, 1915 to 1921. We have seen in an earlier chapter how that needed construction went into motor vehicles and commercial building instead. In 1920, there were, in the United States, almost 5,000,000 people over 10 years of age who could neither read nor write.[2] Of the 28,000,000 children in the country between 5 and 18 years of age, only 16,000,000 were regularly at school.[2] Meanwhile only one child in 54 gets a chance to go to college.[2] The New York Department of Health investigating 1,057 average school children 5 and 6 years old, found 66.7 per cent, or 2 out of 3 with physical defects. An examination of children in Public School No. 64 in New York, revealed 24 per cent, or 1 child in 4, suffering from malnutrition. In 1880, 25 per cent of all farms were operated by tenants; in 1920 this percentage had grown to over 38.[2] The report of the State Commission on Regional Planning in New York in 1923 finds 663,000 persons in the city miserably housed.

Not enough to go round in terms of adequate food, shelter, clothing, education and modest comforts is now being produced, or ever has been produced, since the inauguration of the machine age. Whether the situation has improved in the last generation is still a matter of debate. We incline to the belief that it has improved slightly, but a subsistence level standard for the whole population is billions of dollars—and millions of tons of physical goods—short of being won.

A summary of waste

In the foregoing chapters we have tried to run a chain and compass line through a more or less trackless field. Too often the needle has trembled, the chain broken, the line left its course. To gather in one brief volume the many viewpoints, the twisting concepts, the assorted

philosophies—and some measure of the quantitative data—of the problem of economic waste is a difficult task. Classifications, however carefully planned, usurp one another's territory. Illth merges into the technique of production, production into distribution; man-power is inextricably bound up with materials. Separation for the purposes of exposition has been inevitable, but the underlying separation in fact is more dubious, and often nonexistent except in a very general way. An aeroplane view of America would disclose a very large fraction of the available man-power workless on any given working day; would disclose another large fraction making and distributing things which are of no real use to anybody; and a third fraction taking two hours to do a job which engineers have found can be done in one—and which some men are actually doing in one. And equipped with a sort of earth crust X-ray, the observer would see water invading the oil sands, the mountain coming in on the coal measures; and above ground, the gusher giving its gas to the air and its oil to surrounding landscape, the rush of millions of horse-power down unyoked rivers, the glare of forest fires, the refuse piles charged with unclaimed chemical riches. But once beyond these very broad distinctions, classifications overlap and intertwine.

What is clear by now, however, is the fact that no man or group of men, however profound their research can show in quantitative terms the margin of waste. The percentage of lost man-power to the total available is a figure forever beyond computation. The ratio of the raw material loss to the aggregate annual tonnage taken from the earth is an unknown ratio. We hope we have demonstrated that these ratios are sufficiently serious; that under some sort of co-ordinated community control, immense savings both in man-power and in material might be made, but we have

no illusions as to the practicability of arriving at any final judgment.

What we may do in summary is this—and we trust it is permissible. We may list one by one the outstanding items of loss and leakage which the survey has disclosed, and beside them give such quantitative estimates as are capable of rough verification, and which do not duplicate with estimates in other fields. An addition of such estimates in the three main channels, should give at least a minimum record of the margin of wasted man-power. At the end of Chapters VI, VIII, X and XI such tables have already been prepared. Bringing the totals together:

The man-power going into illth is at least...............	8,000,000
The man-power idle on a given working day is at least..	6,000,000
The man-power wasted in production methods is at least.	4,000,000
The man-power wasted in distribution methods is at least	2,500,000
A total of at least.................................	20,500,000
Against an able-bodied adult population of approximately	40,000,000
Giving a minimum ratio of waste of about...............	50%

On this showing, in that it tends to be a minimum, we have reason to believe that the labor power is available to at least double the current output; and further, that through improved methods of exploitation, there is adequate raw material available with which to double it without exhausting natural resources at any greater rate than they are now being exhausted. In lumber and oil and probably in coal, it would appear that output—in end products—could be doubled while *reducing* the rate of exploitation.

We suspect that an Industrial General Staff would materially better this ratio, but how much we have no means of knowing.

What would a doubled output mean in terms of the

budget of the wayfaring man? Obviously it would mean something quite different from a doubled money income. Doubling food output would provide an immense unconsumable surplus. It is doubtful if food output by weight needs to be increased at all. It needs to be shifted more in accordance with dietetic value, adulteration guarded against, some wanton extravagance on the part of the very rich curtailed, and "dumping" eliminated. The labor saved by keeping food substantially at par could thus go into other necessities and comforts, and if expedient very much more than double their output. Housing construction could probably be doubled for some years to come to great advantage—including the tearing down of slums and a measure of community planning. Clothing output would hardly need to be doubled. With better durability and a decline in super-luxuries and fashions, its increase by weight would not need to be great.

The bulk of the increased output would thus find its way into the production of educational and recreational facilities, and into comforts. On the whole we are inclined to guess that with twice as much labor power available, the last family in the country could be raised above the line of economic insecurity, and still leave a wide range of income levels above that line. There would have to be no "dividing up" process. To double productive power with no increase in population represents a tremendous economic gain. Meanwhile the labor power which now goes into capital goods, in so far as such represent excess and duplicate plant capacity, might compensate for the labor needed to build the by-product ovens, the super-power lines, the rearranged terminal facilities, which a functional control would demand. As we have seen, it is only through large capital outlays that certains aspects of the waste elimination program are possible.

Ultimately there will come a limit to the necessity for an increased amount of goods and services, and the slack may be taken up by dropping the hours of labor from 8 to 7 to 6. . . .

The subsistence level budget is not to be won by taking money away from the rich; it is not to be won by "dividing up"; it is not, emphatically not, to be won by "saving" —to build a plant already overbuilt. It is to be won by striking down the locks which prevent a free flow of that productive power which modern engineering methods have made possible. In brief, by throttling waste. And it is not to be won in any other way.

Again, three billion slaves

We are now in a position to know somewhat more accurately what has happened to the 3,000,000,000 slaves, with whose labor Messrs. Gilbert and Pogue endowed us, in the first chapter. Every man, woman and child in America has now, according to these engineers, in the energy developed by coal, oil and water power, the equivalent of 30 servants. Yet the 30 servants are so lazy or so ill organized that they do not keep us decently housed and clothed and fed. A horse-power of energy is by definition, incapable of laziness. It invariably performs its job of lifting 33,000 pounds one foot in a minute's time. The trouble must be in bad organization, and in the foregoing chapters we have seen something of where the bad organization lies. Our 30 slaves have taken a good many coals to Newcastle in the process of producing and moving the nation's store of goods.

With the main items of waste in mind let us take an aeroplane again and watch the stream of goods as it makes its way to the consumer, fixing our attention particularly upon the gross volume of the moving product. Think of it in

terms of a gigantic cube of assorted natural resources starting its journey from mine and farm and forest. Beyond the inevitable chipping and slicing which the cube must receive in its conversion from the raw to the finished product —from logs to dining room chairs—what hacks and dents does it take that are not inevitable, that better organization might prevent?

Our first observation is that the cube is never full grown to start with. Underground losses in mine and oil pool, cutting and fire losses in the forest, businesslike restriction of output—pioneering exploitation methods generally—keep it anywhere from a third to a half undersized.

Next, a considerable quantity is hacked off on the farm by "dumping." Potatoes are left to rot in the ground; fruit on the trees. Corn may be burned for fuel, and night riders take their toll of cotton and tobacco.

After the cube starts to move, dumping makes further inroads all along the line of march—watermelons in the waters of the Potomac, bananas in New York harbor, fresh vegetables on city refuse piles.

Futhermore, it moves so deviously that a large section is dropped out as spoiled; delayed shipments, cross hauling, stupidly packed eggs, cork on top of onions, losses from preventable cold and preventable heat, antiquated storage space. Much is held so long in storage that it ultimately must be thrown away.

As it moves from factory to factory through the various processes of manufacture, the inevitable slicing is heavily augmented by wasteful slicing. The circular saw takes three times the needed toll of sawdust; leather and textile cutters bungle their jobs, the ordinary steam engine uses 4 per cent of the latent energy locked up in coal; oil evaporates. And a terrible shrinkage results from the failure of the factory to salvage by-products. The air is filled

and cities blackened with needless smoke; clear streams made hideous as the mills open their sludge gates.

Another gouge results from the amount which goes into the construction of mills, office buildings and retail stores; the digging of coal mines; the drilling of oil wells—in *excess* of the plant required effectively to handle the output. Each year some 15 per cent of the total cube is sunk in new capital outlays of which a very large fraction represents duplication and proliferation of a plant already inadequately utilized.

Finally—and most serious of all—is the great section lost in the production of illth—steel for dreadnoughts; chemicals for patent medicines; textiles, furs, foodstuffs, building materials, for super luxuries; housing for quacks; race courses for the gambler; unlimited pulpwood for the advertiser; mountains of material entering the door of the factory sound and fair, and coming out on the shipping platform adulterated and debased. . . .

So slice by slice the cube is whittled down until the net volume delivered to the final consumer is ragged and thin compared with the brave total which began the journey. The thirty slaves are helping to produce things which will never be used, helping to drag things all over the country in loops and circles instead of in straight lines, helping to build tire factories when there are already too many tire factories, helping the salesman to shout his wares, helping to make things of no human value.

The philosophy of waste

Half and more of our man-power counting for nothing; half and more of the yearly output of natural resources needlessly scattered and destroyed . . . a billion slaves of energy turning useless wheels, dragging unneeded loads. Motion, speed, momentum unbounded—to an end never

clearly defined, to a goal unknown and unseen. If there be a philosophy of waste, it lies in the attempt to clarify that goal, to turn men's eyes towards the whyfore of the sweat of their bodies and of their brains.

> Of all the dull dead weights men ever bore
> None wears the soul with discontent
> Like consciousness of power unused.

It almost seems as though there were a relentless law at work which, with every gain in invention, every improvement in technique, threw off a stream of parasites to eat up the slack, and leave us where we were. Invention has gained on population, output per producer grows steadily, but it does not gain when measured against the drift of land workers to the city, producers into distributors, makers of wealth into makers of illth. It is like a factory with 50 men in the workroom and 10 men in the office. There comes a time when 10 men in the workroom can produce an equal output. Let the 50 stay in the workroom and give the world five times the output? No. Keep output at par. Put the other 40 into the office to sell, advertise, compete, break down sales resistance. Not so simple as this of course—but isn't it the trend? How else is it possible to explain the phenomenal increase in productive power, with so little increase in the budget of the wayfaring man? If machinery were abolished tomorrow, half the population and more would have to go back to some form of useful work—or die. The technical arts of today probably call for more workers, relatively, in the overhead services, but is it inevitable that they call for so many as to leave us in a dance that goes round and round with so rarely a step gained? The horn of plenty is overflowing, but a dead hand reaches up to seal its mouth, and the fruits fall as slowly as before.

It is not only fruits that concern us. The elimination of waste—the striking aside of that dead hand—is important not solely because it allows a flow of more roast beef, more bathrooms and more boots. It is important because it holds out the promise of giving the spirit of man a chance to forget roast beef and bathrooms and boots, and to develop whatever creative impulses lie within. It provides a method for getting the chores done and out of the way in the morning with the afternoon free to read in the garret or go on a picnic, or dance a new dance, or sleep in the sun. It does not call for speeding up; it calls for speeding down. The pressure is some degrees too high already—and getting worse. Like the Red Queen in Alice in Wonderland, with the swarms ever moving into salesmanship, quackery, advertised specialties and super luxuries, we have to run faster and faster to keep up with ourselves. Waste elimination does not call for a hard, bright, regimented efficiency—except in the minds of soap manufacturers. It calls for the life more abundant—for living instead of existing. Life, says Havelock Ellis, is a dance; there can be but little dancing when every gain in leisure is cupped off to feed an equal gain in waste.

We have stressed the production of goods by weight in the pages which have gone before because our survey lay in the field of economics rather than in that of the intangible values of the human spirit; and because spiritual values are difficult to cultivate with a job lost, the rent in arrears, and the children crying for milk. Only those who have felt the clutch at the heart which goes with economic insecurity can appreciate the hypocrisy and futility of the well-fed who dare to preach spiritual values. Food, shelter and clothing are not everything, but the dance of life breaks down in the first measure unless their relentless demands are met.

Constructive

We shall be asked for a way out. The study has led us down and down through level after level of ineffectiveness and loss. When we review the methods by which the pioneer lays waste our unreplaceable national resources, it seems as though we touch bottom indeed—a race of weevils consuming its substance without the intelligence for the future which animates a colony of bees. . . .

We know no sure way out. That is why this chapter is called the challenge of waste. A good many books have been written, and a good many more are going to be written, on the way out. Most of them to date are not worth the paper upon which they are printed. To give to society at large the direction and the common sense which animates a camping party caught in a storm, is simple in theory but extraordinarily complicated in practice. The engineering is probably manageable. There are today in America enough good engineers and enough good administrators to run a functional society, and to double or treble the standard of living, could the whole be reduced to blueprints and orders. Starting with the war experience, a book not altogether worthless, might be written setting forth such blueprints.

But the point at issue is the behavior of the animal. The behavior of a camping group is reasonably predicable, the behavior of 100,000,000 people can only be predicted with the aid of magic and astrology—social psychology as a science is still in embryo—and hence the highly dubious character of most of the books promising a way out, so far written. Their data is largely magic and astrology. The way out turns on a genuine science of social psychology more than it turns on any other single factor. J. B. S. Haldane, the biologist, states the case: "Mechanics became a science when physicists had decided what they meant by

such words as weight, velocity, and force, but not until then. The psychologists are still trying to arrive at a satisfactory terminology for the simplest phenomena they have to deal with. Until they are clearer as to the exact meaning of the words they use they can hardly begin to record events on scientific lines. . . . To predict the behavior of men in the mass we require knowledge of a special kind of psychology. And at the present time the expert politician knows ten times as much of it (instinctively) as the best psychologist. . . . I know that this is little comfort to the unemployed workman, or the war widow who watches the approach of the conflict which will claim her only son. But we have not yet got the general principles to apply to their problems. . . ."[3]

Haldane believes that, as with physics, those general principles will be found, and that some day the good psychologist will know ten times as much as the most expert politician. In that day, the first really constructive books will be written as to how waste in the large and in bulk may be eliminated.

Meanwhile we note the co-operative movement making steady headway against wastes in distribution—particularly in Europe; the labor movement combining its demand for more democracy in industry with the realization that only the lessening of waste can raise the standard of living; the several governments, national and local, making progress in the protection of forests, watersheds, animal life, and soils; the Province of Ontario with its giant power system, like a beacon on a hill; the various groups which are working on community planning with a very real and intelligent approach. And we note the gathering cleavage between stock-and-bond business men like Mr. Gary, and engineer business men like Mr. Ford. Mr. Gary sees industry primarily in terms of profitable investment, while

Mr. Ford sees it primarily in terms of services turned out on a balanced load basis—with still an eye to his own profit and loss account. The studies of Mr. Hoover and his colleagues; the work of the American Engineering Standards Committee—the work of the industrial engineer in general—is laying the basis for wide co-ordinated control, with waste, in technical processes at least, at a minimum. In short it is by no means clear that the engineering type of business man will not ultimately supersede the stock-and-bond type, and so usher in a functional society of sorts while the radicals are still baying for the abolition of the profit system. This at least is Mr. E. A. Filene's guess.

Yes, there are movements on foot, promising movements. But this particular inquiry is not concerned with their appraisal. That after all is another story. So far as we see the future of the abatement of waste, it lies with the man of science—the social scientist, the engineer. For upwards of one hundred thousand years, the mystics, the medicine men, the orators, the spellbinders, the personally violent, the personally crafty, the dealers in the evidential sky-rockets and pinwheels of rationalized sophistry, have imposed upon the underlying population whatever deliberate control has existed. And the net result of their efforts lies on the front page of any newspaper, and on the pages of this book. It is difficult to see how the man of science can do worse.

We have no illusions as to the technical precision of the foregoing chapters. More than once we have been lost in a trackless wilderness; always our communication lines with the real work-a-day world have been tenuous. As one stands on the streets of a great city like New York, dwarfed and shadowed by mighty buildings—solid as monoliths; the roar of the traffic in one's ears; brushed by innumerable passersby each intent on the next thing which

must be done; subways thundering below; the shriek of steamer whistles from the harbor—one is overwhelmed with the audacity of trying to change or to modify this stupendous reality. Waste, friction, jam? Yes . . . and what of it? See the way that cornice fits its marble wall, the precision of lintel and arch, the woven steel nicety of the naked skyscraper, the curve and flow of motor bodies, subway trains wild as stampeded elephants, yet slowing to the inch mark on the platform. Come, you measurers of lost man-power and let us see you fit one stone upon another, rivet one girder to an upright, direct one rush hour at Times Square! We may waste, but Almighty God will bear witness we can build!

One goes blindly back to one's desk, and the gathering sheets of manuscript take on an immense futility. Leaves to be blown by any wind that passes, fluttering down to mold and die. These moments come, their dark shadow stands over us, and we wonder if this book is worth the writing. Who shall say in the dance of the human pageant down the centuries, what is waste and what is weal?

No, illusions we may have, but they are pierced with the stark arrows of the repeated helplessness of mankind before its destiny. In the war we glimpsed control, but it was control only to further a vaster and more tragic waste. Where are the scientists and statesmen to dig their hands and brains into this roaring wilderness—so finely wrought in isolated detail—and bring from it ordered cities, impounded waters, terraced and tended forests, the sweep of great transmission lines, clean rivers, workshops planned with the dignity of cathedrals, and the end of grime and poverty, and despair?

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Tona-Vin	18
Hostetters Celebrated Stomach Bitters	25
Vita-Pep	16
Wine of Cardni	20

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